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ABSTRACT

The concept of a problem-focused coursework model, the main inservice vehicle examined in this research conducted at Simon Fraser University in British Columbia, incorporates traditional university input with training in implementation skills for teachers. The study examined the impact of a problem-focused model of coursework on the instructional practices of teachers, and analyzed whatever changes occurred in the classroom and the schools involved, from selected perspectives drawn from the literature on school improvement. Following the first section of the report, which provides a discussion of the problems that the study attempted to address and an account of the objectives that directed the study, the second section presents a summary of literature in three areas: teacher-initiated innovation; university coursework as inservice education; and observational methodology. The third section describes the procedures followed in the study. The fourth section discusses the results in the form of seven case studies and results from interviews and questionnaires. A final section provides a discussion and interpretation of results. Results provided evidence that traditional university coursework does little to improve classroom practice partly because much of it is foreign to practice and partly because few attempts have been made to assist teachers in implementing the ideas that are presented. A 10-page reference list, descriptions of courses and projects of interest to teachers, evaluation sheets, and an undergraduate education course information sheet are appended. (JD)

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Problem-Focused Coursework as a Model for In-Service Education: Case Studies of Teacher Initiated Change

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February, 1986

This is a final report to Simon Fraser University of a research project funded through the Programs of Distinction. Any opinions expressed in this technical report are those of the authors and do not necessarily represent policy of the university.

Additional copies of this report can be obtained at a cost of $10.00 Canadian ($7.00 American) by contacting the senior author at the Faculty of Education, Simon Fraser University, Burnaby, B.C., Canada, V5A 1S6. Copies of an executive summary are also available.

The Problem-Focused Course as a Model for In-Service Education

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INTRODUCTION

The Problem Addressed

A faculty of education within a university has two purposes: research and teaching. Implied within both is a third which is to disseminate knowledge and information to those who work in educational institutions and to others who are interested in educational issues and concerns. The aim of such dissemination must obviously be to improve the education of children and young adults in our schools and related organizations. Indeed it is difficult to imagine justifying the expense of faculties of education if one could not argue at some point they were improving the education of young people.

Little evidence exists to show any direct or even indirect link between the dissemination function of faculties of education and the improvement of teachers' classroom practice. In fact, when teachers are asked about the usefulness of university coursework in education, they are less than laudatory in their response. Where teachers have been asked to reflect upon their teacher preparation they are highly critical and they tend to rank universities low in terms of providing them with avenues for professional growth. While the available evidence of such views is too limited to draw any firm conclusions about the link between the dissemination function of universities and improved classroom practice, it does point to the need for educators to develop and examine alternative ways of assisting teachers to improve their classroom practice through applying new information.

The roles played by Faculties of Education within the educational community must also be seen within the more general problem of school reform for which the responsibility is more widely shared with Ministries of

Education, local school districts, and other agencies.[1] The history of school improvement efforts at all these levels has not been an impressive one. Where such efforts have been systematically analysed, the results have always been disappointing (Hoetker & Ahlbrand, 1969; Goodlad & Klein, 1974).

One of the earlier reviews of quantitative, and of what were termed impressionistic studies, conducted by Hoetker and Ahlbrand in 1969, showed a remarkable stability of classroom verbal behavior patterns over the period of their review. Despite the fact that each successive generation of educators had condemned the rapid-fire question and answer approach to teaching, this practice continued unabated.

In the early 1970's, Goodlad and his co-workers (1974) sought to identify the extent to which the new developments resulting from a decade of curriculum reform were being used in the classrooms of the United States. Their work was timely because it followed on the heels of 20 years of active educational reform which included organizational and technological changes as well as new methods of instruction. In their book, Behind the Classroom Door they reported little evidence of the reforms that were to have changed the schools of that country. They argued:

> "The highly recommended and publicized innovations of the past decade were dimly conceived and at best partially implemented in schools claiming them. The novel features seem to be blunted in the effort to twist the innovation into familiar conceptual frames or established patterns of schooling." (p. 72)

Most classrooms appear to remain virtually untouched by the efforts of outsiders to change them.

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[1] These agencies vary from one jurisdiction to the next. In some countries such as the United States and Great Britain national governments have played a major role in funding school improvement efforts.

If our past is any guide, it appears that improvements in teaching are unlikely to occur without at least a better understanding of how improved methods of instruction can be implemented. At the 1984 annual meeting of the American Educational Research Association, Matthew Miles expressed concern that the potential for school improvement arising out of the school effectiveness research is in jeopardy because of the serious under-attention to issues of implementation.

One of the difficulties in achieving school reform arises when such comments are taken to indicate that there is a technology of implementation which can be applied by outsiders. School improvement is treated as something that can be achieved through developing new ways of implementation, better products for teachers to use, and administrative strategies for school reform. A growing body of opinion, which we cite later in the report, maintains that such efforts have failed in the past and will fail again. It contends that teachers and their work must become the focus and that teachers should be given much more autonomy in deciding not only the process of such reform but also its substance.

Universities have approached the task of the implementing of new ideas by reoffering university courses to practising teachers. While such courses do present new ideas and information on how instruction might be improved, they appear to fall short in providing teachers with the ways and means of applying such improved instructional aproaches within their classrooms. The problem lies partly in the coursework itself and partly in the broader context of the school culture in which teachers carry out their work.

The recognition that traditional university coursework has had little impact on the work of teachers has led to several initiatives at Simon Fraser University designed to improve course offerings. These initiatives are discussed below under context. The aim typically has been to provide the teacher with the skills, support, and an approach that would build some means of implementing what has been learned into the coursework. In fact, such application has generally been an important component of most courses. The problem-focused coursework model, which was the in-service vehicle examined in this research, had grown out of these developments.

The concept of a problem-focused coursework model -- the main in-service vehicle examined in this research -- incorporates traditional university input with training in implementation skills for the teachers. It has gained attention recently (Hopkins & Wideen, 1984; Hopkins, 1985; Stenhouse, 1984). Although the teacher remains central to the improvement of schooling, the socializing effect of the school's culture (Sarason, 1982; Lortie, 1975) has shifted the question of implementation to the school level. The term "school improvement" has come to describe such efforts (Joyce, Hersh & McKibbin, 1982; Hopkins & Wideen, 1984). While much has been learned over the years about the characteristics of innovations that can be implemented most effectively (Berman & McLaughlin, 1978; Fullan, 1983), much less is known about what actually occurs within a school when a new idea is introduced by a teacher.

By examining a novel approach to the in-service education of teachers through coursework, the study described in this report was designed to address both the general problem of school reform and a number of questions currently of interest to those planning coursework and in-service education for teachers.

The Objectives of the Study

In the spring of 1983, a research project designed to examine the effects of University coursework upon classroom teaching was funded by Simon Fraser

University under the Programs of Distinction.[2] The original objectives of the study were the following:

1. To examine the impact of a problem-focused model of coursework on the instructional practices of teachers;
2. To study the interaction between teachers involved in the model and the school in which they teach; and,
3. To analyse whatever changes occur in the classroom and the schools involved, from selected perspectives drawn from the literature on school improvement.

It was decided early in the study to gather data relative to the effects of coursework in general. This was done to find out if our project teachers were generally similar to others in terms of why they took courses. Thus, we added to the study an examination, both through questionnaire and interview, of the reasons for teachers' taking courses and the effects they perceived such courses' having on their teaching.

The second objective took a low priority in the study as it became clear early on that despite the expressed support of the principals in whose schools the teachers in our sample worked, few interactions related to the problem-focused course. Thus, the first and third objectives received priority in the study.

The problems that were addressed by the study were both immediate and practical on the one hand and theoretical on the other. The question of whether coursework in general, and this model in particular, had any effect upon classroom practice was one of the practical problems addressed by the study. We expected to obtain information whereby planners of coursework and in-service education could improve such offerings.

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[2] The Programs of Excellence fund selected projects each year, most of which have a research orientation.

This question was seen imbedded within the more theoretical problems of educational reform and the change process. In particular, we were concerned with the roles played by support persons in assisting teachers to change their practice, knowledge transfer and utilization, and the particular approach to change that explained the process that teachers underwent. These questions are discussed in more detail in other parts of this report.

The Context of the Study

This study should be viewed within two contexts: Simon Fraser University's Faculty of Education, and each subject teacher in his or her school.

The University

The Faculty of Education at Simon Fraser University offers courses to practising teachers for the completion of undergraduate degree programs and for post baccalaureate work. These coursework offerings cover the typical areas in education and as in most faculties, the focus is usually upon new developments occurring in the areas being taught. The materials, skills, and knowledge are presented, and the implementation and application of them are usually left to the teacher.

Since the faculty's beginning, however, faculty members have initiated a variety of innovative approaches to coursework designed to build into them some means by which what was being learned could be implemented in the classroom. Five such projects will be described briefly to provide a context for understanding the coursework model which is the subject of this research.

In 1969, an educational practice program was introduced at the graduate level for practising teachers. Its aim was to provide teachers with the direction and support to change their classroom teaching. Over a two year period teachers analysed their teaching and took steps to alter their approach within the context of a framework set out within the program. In describing her experience with the program, Wasserman (1978) points out the importance of time for teachers to make the adjustment to change as well as the need for support while that change is taking place.

Another project initiated at Simon Fraser University was one based on the concept of self-education. Gibbons and his co-workers, building on his research of the self-educated person (Gibbons, 1974, 1980) and his concept of walkabout (Gibbons, 1974), developed a program of self-education for teachers (Gibbons & Phillips, 1980; Gibbons & Norman, 1983) which provided a series of steps to engage them in a process of self-education. While this work was not associated with a specific course as such, it has influenced a number of projects at Simon Fraser.

The concept of the self-directed learner proposed by Gibbons became one of the main components in a coursework model developed by Hopkins and Holborn (1983). He also drew on the work of others such as Stenhouse (1975) and Joyce and Showers (1980) to develop a course in curriculum development around the notion of the teacher as researcher. In addition to being responsible for the material related to curriculum development, those in the course had to undertake some project within their classroom that could be approached from the perspective of doing action research.

In a new course at Simon Fraser University, "Why Write? Writing Across the Curriculum," Strachan (1985) began by having teachers examine their present understanding of the subject and then provided a framework within which they could individually build a fuller and more complex view. During the course, she required teachers both to experiment in their classes with the strategies being taught, and to reflect on their attempts through writing in teaching-process journals. In-class discussion and individual feedback on the journal entries focused on what the teachers had accomplished in their classes and on how they could improve further.

These initiatives and others, which have not been reported, influenced both the development and flavor of the problem-focused coursework model, the subject of this research. A detailed discussion of this coursework model is provided in a later section.

The School

Although all the teachers taught in public schools and although all but one were elementary teachers, their school contexts were very different. They had differing levels of support from principals and other teachers (one teacher, in fact, was at an alternate school where there was no resident principal and where teachers taught in separate "huts"); they were in different school districts with different curricula and organizational structures; and they taught at different grade levels.

In addition, their personal contexts were different because they had various reasons for enrolling in the problem-focused course. Primary among these was the desire to upgrade certification. Other reasons frequently cited were the need for general, professional growth and the desire to gain specific skills in certain areas. During in-depth interviews it became apparent that for many teachers the university offered an escape from the isolation of school and classroom.

In the Results section of the report case studies for each teacher and a more detailed account of the context for each teacher are provided.

Overview of the Report

Following this first section of the report, which provides a discussion of the problems that the study attempted to address and an account of the objectives that directed the study, we summarize the literature in three areas related to the study: teacher-initiated innovation; university coursework as in-service education; and observational methodology. The third section describes the procedures followed in conducting the study. The fourth section discusses the results in the form of case studies and results from interviews and questionnaires, and a final section provides a discussion and interpretation of the results.

Detailed notes, transcripts and summaries that led up to the case studies are included in a separate report. An executive summary is also available.

BACKGROUND LITERATURE

The review of literature that follows summarizes our examination of work in three areas relative to the problem. Because the particular coursework model used represented an approach in which the onus for in-service education was placed on the teacher, we first examined the literature on teacher-initiated innovation. Second, because we wished to relate the findings of the research to the larger realm of coursework in general, thereby providing useful information to both teachers and universities, we reviewed that literature which was available on university coursework as in-service education. Third, because we faced the task of establishing regularities in classroom practice, we examined selected papers dealing with classroom observation. These three sections follow.

Teacher Initiated Innovation

The concept of teacher-initiated innovation in schools is one of long standing. Isolated cases of individual teachers who have 'bucked the system' to make changes in what they did in their classroom are well known to most of us. In recent years, however, not only has the concept received increasing attention in the literature, but it has prompted a number of projects[3] designed to support teachers in their efforts to engage in teacher-initiated innovation and action research. The underlying assumptions of these project developers about the work of teachers, how change is made in classrooms, and how both are informed by knowledge and information, present an alternative to the traditional view that has typically driven attempts at school reform.

We use the terms traditional and professional autonomy to represent these two views of a teacher's work. The traditional view is that which is most common and typically drives school reform. The professional autonomy view is used in this discussion to represent a body of opinion advocated by those who argue for teacher-initiated school reform.[4] The two views hold different assumptions with regard to theory, practice, curriculum, and supervision as they relate to the work of teachers. In the summary of literature that follows in this section, we examine the underlying assumptions that underpin these two views.

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[3] In addition to those projects discussed in this section see Hopkins (1985).

The Work of Teachers

In the traditional view, theory is intended to drive practice in what McKeon (1952) describes as the logical approach. Experts do research to determine principles of learning and practice that are implemented by teachers. School improvement in this view is a matter of disseminating such findings to teachers and assisting them in the process of putting them into practice. Curriculum, constructed by experts, thus becomes a blueprint to be followed by teachers. It is assumed that where textbooks and curriculum have been appropriately field-tested, they should be transferable to other teachers. The emphasis in curriculum development is on front-end loading to insure that materials are as usable and as teacher-proof as possible. Standardized examinations provide a means of insuring that the prescribed curriculum has been covered.

Supervision then is aimed at judging the extent to which teachers have implemented such curriculum. The more closely a teacher uses a given set of practices the better the fidelity of implementation. As Ireland (1982) points out, this view "emphasizes the subordinate nature of the teacher as the recipient of the expert's wisdom, the technician who carries out the curriculum order....." (p. 5).

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[4] Ireland (1982) used the terms coercive and bureaucratic to describe what we have termed the traditional approach. Our use of professional autonomy was borrowed from Ireland.

As we indicated earlier, this approach was the prevailing paradigm during the curriculum reform movements of the 1960's. The development of curriculum by experts and its proper dissemination were expected to lead to better teaching. A similar view prevails today in most jurisdictions which prescribe curriculum, select textbooks, and monitor outcomes through assessment and final examinations. The teacher is the agent expected to carry out directives from central offices.

This traditional view of the teacher's work has been subject to intensive criticism and many educators agree that major reform efforts based on such a stance (such as those of the 1960's) have failed.[5] Among the most critical have been those who propose a view that we have elected to call teacher autonomy.

In this view, the teacher is seen "as an autonomous professional, equal to but different from the university researcher, the curriculum expert, and the supervisory colleague" (Ireland, 1982, p. 6). The theory/practice relationship is considered to be more of a dialectic (McKeon, 1952) one in which research findings become testable hypotheses and the teacher becomes a researcher and the classroom a laboratory. The concept of fidelity in transfer is not accepted because the uniqueness of each classroom situation requires adapting the innovation rather than seeking fidelity (House, 1975).

The major proponents of this second view see the teacher either as artist (Stenhouse, 1984) or researcher (Corey, 1954; Rappaport, 1970). Their views are not in opposition to one another; both share the position that the teacher should have power. The difference between the two arises from the way in which that power is exercised. Stenhouse has been the strongest advocate for viewing the teacher as an artist. He contends that the improvement of schooling hinges on increasing the number of outstanding teachers who are not continually being frustrated by the system. Such teachers are autonomous in their professional judgement, a condition necessary for the artistry of the teacher to occur. He defines art as an expression of meaning through skill.

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[5] See among others Hopkins (1984), House (1975), Mann (1976), McLaughlan (1976).

The second perspective on professional autonomy is found in the literature which views the teacher as researcher. The seminal works of Corey (1954) and Rappaport (1970) appear to have provided the essential underpinnings to this approach. Rappaport describes action research as something which contributes both to the practical concerns of teachers in an immediate problematic situation and to the goals of the social science by joint collaboration within a mutually acceptable ethical framework. It is the intent that the teacher not only focus on problems in his or her own workplace but learn from those experiences in ways that contribute to the goals of social science, that separates many of those who view the teacher as researcher from those who refer to the teacher as artist.

The role of traditional educational research takes on a very different form if one views the teacher as having professional autonomy. The teacher now becomes the pragmatic sceptic (Doyle & Ponder, 1977-78), replicating and testing the ideas derived through conventional research. Such research may also become the analytic frameworks (Roberts & Russell, 1975) by which teachers examine and reflect upon their own practice.

The curriculum is no longer a program to be covered but rather a set of general guidelines in which teachers exercise professional judgement. Teachers' ideas translate into practice and the curriculum becomes a means of studying problems and the effects of implementing various practices and ideas. They filter changes in curriculum through their perceptions of the classroom and through their own meaning system. It is through such activity that a teacher increases her professional understanding of her own work thereby bettering her teaching (Stenhouse, 1984).

Supervision and the role played by outsiders are very different when the teacher is assumed to have professional autonomy. The supervisory role can be played by anyone, colleague, principal, or student. The key is that the teacher maintains control of the process by specifying what aspect of his/her teaching is to be observed (Cogan, 1973).

Change

Most who write about the schools agree on the need for change and improvement. Where they begin to differ is in the way that change can best come about, and in some cases what the end result of such change ought to be. Our purpose in this section is to comment on how those who advocate teacher-initiated innovation differ in their view of the change process from what has been traditionally accepted. We leave the questions about the differences in the substance of the change to others.

Commonly, change within the educational structure is seen as a means by which those in positions of power exercise sanctions and control in order to achieve change. Central directions are set, normally in consultation with a broad constituency, and information is provided to enhance the implementation of those directions. Sanctions and rewards are applied to further application. Individual initiative and interpretation are permitted, but they fall within fairly well established guidelines. Chin and Benne (1976) term such strategies power-coercive with no pejorative connotations intended.

Traditionally, we have also relied greatly on strategies which Chin and Benne refer to as rational empirical. Here the emphasis is on providing people with knowledge. It is argued that people are rational and that if good information is brought to their attention they will act upon it. This has been the predominant argument on which university coursework has been based. It was also the rationale behind much of the curriculum reform of the 60's.

Those who advocate teacher-initiated innovation tend to reject power-coercive change strategies, particularly when such power is exercised from high places. They argue that no significant changes result when sanctions and force are applied. They do not doubt the importance of knowledge, but as we point out in the next section, they take a very different view of its use to the classroom teacher.

Change, under this view, occurs when the normative patterns of individuals become modified. Norms change through a re-educative process encouraged by peers and supported within the cultural milieu in which people work. People are seen as having their own need states and desires. They do not necessarily respond to directions that might be imposed from outside. Skills in problem-solving and group processes become as necessary as the knowledge of curriculum.

Knowledge

Those who advocate professional autonomy for teachers take a very different view of what constitutes knowledge about teaching and how such knowledge can be used to improve the work of teachers. Again it is useful to contrast this view with that which has traditionally been offered in professional communities. As Schon (1983) points out, the dominant epistemology of practice among professions has been that "professional activity consists in instructional problem solving made rigorous by the application of scientific theory and technique" (p. 21). Such a model of technical rationality he contends is based on professionals acting upon knowledge that is "specialized, firmly bounded, scientific and standardized"

(p. 23). Such knowledge emerges from those who do research and development. Those in the professions such as teachers apply and act upon such knowledge.

The prevalence of this view of knowledge in the educational establishment is underlined in a comment made by Love (1985) in a recent review of knowledge transfer and utilization in education. In summarizing conceptions of knowledge he notes:

> Lindblom and Cohen also discussed the role of 'ordinary knowledge' that is not produced by professional social inquiry but stems from common sense or thoughful speculation and analysis. Most writers who concern themselves with the theme of knowledge transfer and utilization are not thinking of ordinary knowledge in the Lindblom-Cohen sense. (p. 340)

He does go on to point out that more attention to the concept of ordinary knowledge might assist us to understand more why practitioners under-utilize research.

One of the main arguments behind encouraging action research among teachers is the recognition that the production of knowledge through conventional means not only excludes teachers from the process but the products of that research are unfamiliar and uninterpretable to them (Jacullo-Noto, 1985). However, the argument goes much deeper than that. Stake argues a case for vicarious experience (1985) as might be embodied in, for example, a detailed case study. He contends that the sharing of such experience produces knowledge that is in keeping with the teacher's epistemological view of teaching (1976). Schwab (1969) argued for a shift from the use of theoretical to the use of practical knowledge in improving curriculum. He saw little hope of progress in curriculum improvement until this shift occurred. Both Stake and Schwab along with Schon (1982) argue for a changed notion of what constitutes knowledge for a teacher. The contention is that practitioners act upon their own interpretation of what works for them in practice. Such information is most often derived from reflection and experimentation.

Commentary

In this brief summary we have tried to show that those who advocate teacher-initiated innovation are guided by a very different set of assumptions from those which have been accepted in the mainstream of educational thinking for several decades. They view the teacher as having much professional autonomy and make different assumptions about the change process and what constitutes knowledge and its use. It is important to note that differences do exist among advocates of this view. In the four examples that follow some of these differences will be pointed out.

Four projects from three different countries typify the notions underlying the professional autonomy perspective: The Ottawa Valley Teaching Project (Ireland, 1982), the Ford Teaching Project (Elliott, 1976), the study of Interactive Research and Development on Schooling (Griffin, Lieberman, & Jacullo-Noto, 1982) and the National Writing Project.

In the Ottawa Valley Teaching project, (Ireland, 1982) teachers were invited to clarify the aims and principles implicit in their teaching and to develop and test hypotheses as to how they might realize such aims and principles in practice. The project saw the teacher as a researcher and viewed the process as bridging the gap between image and reality. When teachers examined tapes of their own teaching they typically found that they talked too much, directed the flow of information far too much, and asked non questions. Efforts among the teachers in the project were designed to move away from these realities toward an image of their teaching which saw a greater control of the learning situation in the hands of students. The staff worked with a group of teachers for a one year period; a number of conclusions were drawn which pertain to this study.

While teachers were willing and able to identify discrepancies between the real situation in their classroom and their ideal, few had alternatives available to them. Ireland found the teachers to have an unclear image of their own behavior. He also reported that while organizational changes could be rather easily accomplished, those changes which required modifications of behavioral patterns were very difficult to accomplish.

The Ford Teaching Project, which grew out of the Humanities Curriculum Proposal (Stenhouse, 1970), was conducted in Great Britain. Forty teachers were recruited from 12 schools to implement approaches which were liberating and emancipatory to both pupils and teachers. The pupils were encouraged to argue and show independence of thought; the teachers were to use their own judgment and to be experimental in their teaching. All the teachers had to be experiencing some dissonance between their practice and their aspirations. The project team was not interested in no-problem teachers (Elliott, 1976; 1981). Based on their experience with the project, the authors hypothesised that teachers showed greater ability to tolerate threats to their self-esteem as their personal identity became less identified with their teaching and as they began to see themselves as observers and researchers. These teachers were also more open to the visits of other teachers and to observer feedback.

The developers of both projects drew heavily on the work of Stenhouse. The points identified earlier with regard to this perspective were clearly illustrated in the framing of these two projects. Also, it is clear in the rationales that their perceived reasons for the failure of the curriculum reform movements in both the United States and Great Britain not only shaped the design of the two projects, but were instrumental in initiating them. In neither project did the authors address the question of whether or not the project activities in which the teachers were engaged did in fact affect their classroom instruction. No mention was made of institutionalization.

In the United States, a project bearing the title, Interactive Research and Development on Schooling (IR & DS) (Griffin, Lieberman, & Jacullo-Noto, 1982) was conducted from 1979 to 1981 by a group at Teachers College, Columbia University, New York. The project was based on the earlier work of Corey (1949) and a later project carried out by Tikunoff, Ward, and Griffin (1979). The IR & DS model was based on the two premises that traditional research excluded the teacher and that its findings were typically unfamiliar and uninterpretable to teachers. The project involved the establishment of teams of 4-6 teachers, 1 researcher and 1 staff developer. Each team was followed and observed by a member of the research staff. Three themes emerged from the study to explain the experience of the teams at different periods: conflict, leadership, and rewards. The authors claim that the project demonstrated the power of collaboration as a staff development strategy in several different contexts.

The National Writing Project in the United States was conceived as an innovative staff development model at Berkeley in 1974 (Goldberg, 1984). Responding to what was perceived as a teaching problem in the elementary and secondary schools, James Gray invited twenty-five outstanding teachers from the Bay Area to share and reflect upon their successful practices in teaching writing. In a five-week Summer Institute, the teachers each gave a ninety-minute presentation to demonstrate an approach they had found effective in improving student writing. They also read widely in the field of composition research and engaged in writing and reflecting on their own writing processes as well as on teaching methods. The project recognized the participating teachers as professionals whose experience could contribute to knowledge about teaching. It also recognized the value of enabling teachers to articulate their practice to a critical, interested audience of colleagues.

The model has proved to be empowering to many thousands of teachers who have since gone through the Summer Institute experience. To date the model has been replicated at 143 sites across the United States and in seven other countries. In 1984, 2,600 practising teachers participated in the Summer Institutes, and during the year, they and teacher-consultants from previous years served as presenters of in-service programs attended by 40,000 teachers (Gray, 1985).

While the model of problem-focused coursework that was the subject of this research drew from the views expressed by those advocating professional autonomy, it was not the product of any single writer, perspective or project. It did reflect the conviction that the teacher must be at the centre of curriculum reform and that the schools will improve as we increase the number of dedicated teachers who are able to sustain their own professional growth. We discuss the relationship of the problem-focused coursework model to this literature further in a later section.

Evaluation of University Coursework as In-service Education

Although there is widespread evaluation of university coursework, mainly by student-questionnaires, evaluation is rarely directed toward specific courses in education and even more rarely makes any effort to determine the effects of in-service education coursework. "In-service education" is defined in this review as "those education and training activities engaged in by teachers following their initial certification" (Bolam, 1980, p. 3). The basic problem is that general student questionnaires about coursework and university teaching understandably focus on what a student gains from the course: its structure, its assignments, its clarity, its fairness, its level of difficulty. Certainly these aspects of courses are relevant to education students. However, they are not sufficient to evaluate an education course, particularly one in the area of curriculum and instruction. In such areas, as we indicated in the introduction, the "proof of the pudding" is in how that university coursework affects what the education student does in the classroom when he or she has completed the course.

Certainly student teaching serves as a partial evaluation of university education coursework, but it is not usually considered as such since many university faculties of education separate the student teaching "course" from the curriculum and instruction methods courses. In addition, the factors which cause the student teachers to succeed or fail in the practicum are often related to general communication or organization skills, attitudes toward children, or personality attributes rather than to methods of teaching per se.

Just as student teaching supervisors and cooperating teachers in the schools do not see student teaching as an evaluation of university coursework, neither do the student teachers. In fact, they say that coursework is not helpful to them, particularly in comparison with the "real" experience of student teaching. "Course work was seen by students as being largely irrelevant to the concerns of the classroom" (Wideen and Fullan, 1983, p. 9).

Whether or not practising teachers share their preservice colleagues' disappointment with university education coursework is not clear. Practising teachers who take university education coursework are in a different context from preservice teachers. They generally have more choice in the courses they take either to complete their degrees or to obtain diplomas in such areas as special education or English as a second language. They also take courses for interest or for strengthening an area of their teaching. They do not have a university supervisor who visits their classrooms and evaluates their teaching. They are also less anxious about their teaching performance than preservice teachers.

Our knowledge of practising teachers' reactions to education coursework is scanty because so few studies have looked at this aspect of in-service. Many studies address school improvement, staff development, masters' programs for teachers, or school-based in-service courses or programs. Only a few studies in recent years address university coursework as in-service education.

Several such studies which had promising purposes and designs were disappointing in their results because they were limited by inadequate or incomplete evaluations or limited scope. Bolam (1980) and Liggett (1982) relied primarily on self-reports of changes in teaching behavior to evaluate the effectiveness of university in-service courses. A potentially important study of the effectiveness of university courses for high school chemistry teachers had not been completed in 1982 (Bundschuh, El-Awady, Hardin, Hughes & Shelton) and has not yet been reported. Martin (1983) studied the effectiveness of a one-year course to improve the cognitive level of the teaching of teachers of the deaf. He used self-reports from teachers as a means of evaluating the course, but supplemented these with supervisors' reports and the administration of the Haney test of inferential teaching. The self and supervisors' reports indicated significant improvement in the cognitive level of teaching for the experimental group. Results of the Haney test, however, showed no effects of the course.

Another study of a course designed to increase the cognitive level of teaching (Mahler & Benor, 1983) used pre and post course videotaping and coding of the classes of Israeli medical professors to determine whether or not a four-day workshop designed to help professors increase the activity level of students and the cognitive level of language used in the classroom was effective. Their results showed a "conspicuous rise in activity and cognitive levels", particularly in medium-sized classrooms (30-35 students).

Yarger and Broadbent (1982) evaluated a Syracuse, New York summer school program designed to help practising teachers discover methods and materials best suited for their teaching activities. They used questionnaires on the last day of the program and again six months later. In addition, they interviewed and observed ten randomly-selected participants. They found that there was a successful transfer of training to the classroom and some sharing of skills and materials with other teachers in the participants' schools.

Brown (1984) studied the performance of first-grade children after their teacher had taken a four-month university course in language functions. She tested the children individually, asking them to perform various tasks such as recalling a story or giving directions to another child. She carried out these individual tests both before and after the teacher had taken the course, and audiotaped each test session. She found increases in children's complex reporting strategies, improvement in providing appropriate responses to picture stories, and an increase in scores for retelling a story. Even though her study is severely limited because she had only one experimental teacher and one control teacher, it is helpful because she was able to demonstrate some effects of university coursework on the children in the classroom. In addition, in a personal interview with the experimental teacher two years after she collected data for the study, Brown found that the teacher felt she had internalized what she learned in the language functions course and she used the concepts of the course consistently in her teaching (1985).

Wasserman (1978) assisted three high school teachers to change their approaches to teaching chemistry. The teachers took "a long and hard look at their teaching practices, through focused videotape feedback" (p. 40). She then helped the teachers make changes in their teacher-student interaction and in development of curriculum. The teachers practised their new skills and monitored the changes through discussing videotapes of their classes with each other and with Wasserman.

As this brief review shows, not only is there very little literature on university in-service coursework, but also most of what is available is either inadequately described (Brown does not describe the language functions course at all), inadequately evaluated (too much reliance on self-reports), or not yet evaluated (Bundschuh et al., 1982).

However, three studies had more to offer as background for the present study: those by Mahler and Benor (1983), Wasserman (1978), and Yarger and Broadbent (1982). The Israeli study (Mahler & Benor, 1983), with its concern to record baseline data before the medical professors participated in the university in-service workshop, reinforced the importance of having a clear picture of instructors' teaching practice before any changes can be noticed. Although we did not use as elaborate a coding procedure, we made certain that we had full descriptive detail on the teaching practice of our subjects to serve as baseline data.

The Wasserman program (1978) allowed the teachers to discover for themselves the discrepancies between what they wanted students to learn in their classrooms and what the students were actually learning. In this way it was similar to the problem-focused coursework model. Rather than observe the teachers in their classrooms, Wasserman participated with other teachers in discussing videotapes of classes. These discussions helped the teachers monitor the changes they were making and come to a better understanding of what they were doing as they helped students learn chemistry.

Because the Yarger and Broadbent study (1982) evaluated a summer school designed to help teachers discover their own best methods and materials in their own contexts, their study appears to have some similarities to the objectives of our study of changes in teachers' teaching after they have taken a problem-focused seminar, the focus of this study. Their evaluation techniques are also similar to those used in this study because they include questionnaires, observation, and interviews.

We have made no attempt here to survey the large body of research on other modes of in-service education, but it may be possible to apply generalizations from that research to study university in-service coursework. As one example, although teachers appear to prefer school-based in-service (Bolam, 1980; Vandenberghe, 1978), if university-based in-service can incorporate some of the components of previously successful in-service education, it may be more effective. These components include, for example, "theory, modeling, practice, feedback, and coaching to application" (Joyce and Showers, 1980, p. 385); however, there are indications that those components are not enough, and that teachers need, in addition, some opportunity for understanding and reflection on individual practice in context (Gray, 1985).

The problem-focused seminar which is the basis of this study incorporated many of the ideas arising from these projects. Ideas for identifying, limiting, and solving problems were provided in the university classroom; and coaching, feedback, and opportunities for reflection were offered non-evaluatively in school classrooms.

Observational Methodology

In order to describe and evaluate the effects of the problem-focused coursework, we required some means of identifying the changes which occurred in teachers' classroom practice. We could not anticipate what those changes might be since we were not, at the time of establishing baseline data, aware of what the teacher would single out as a problem to address in the course. Our task therefore seemed to require that we be able to compare the patterns or regularities in each teacher's practice with some degree of accuracy and precision both prior to and following the course work.

That such regularities do exist in the classroom has been noted by Doyle (1983) and Miles (1984). The nature of these regularities, however, is particular to individual teachers although the areas or categories within which they occur are generalizable to all classrooms. It is in the nature of the teaching task that information about it can be subsumed within such categories as: role of the teacher; role of the student; planning; lesson organisation; evaluation; interactions; view of or approach to the subject; and nature of the class. The literature on classroom study offers observational methodologies for the gathering of such data which range from atomistic to holistic approaches, from category systems' frequency counts of discrete behaviours to detailed ethnographic documentations of behaviour within contexts. We examined this range to determine which methodologies might most appropriately provide the data to answer our questions.

Atomistic Approaches

Category systems have been and continue to be widely applied to classroom observation. They are used to describe both verbal and non-verbal behaviour in non-evaluative terms and to focus on behaviours which can be specifically named and isolated for purposes of measurement. These systems attend to small bits of action rather than to global concepts. They are thus low-inference in nature and observers can be trained to achieve a high degree of agreement about what is observed. The systems are used to determine and describe actual teaching patterns; to test teaching models developed from theoretical constructs; to field-test methods of teaching following training; and to provide teachers with a means of getting feedback on their own behaviour. Most are one-factor systems in which each behaviour is coded only in terms of its frequency.

The need for more comprehensive information on classroom interaction led to the development of new systems. Gallagher (1968) added three classifications to each topic of classroom interaction. These classifications were: 1) emphasis on skill or context; 2) the level of conceptualization; and 3) the logical style used by the teacher (e.g., description, explanation, expansion). Other ways of refining and differentiating were developed by Amidon, Amidon, and Rosenshine (1969) who modified the ten categories in Flanders' Interaction Analysis. To 'Teacher asks questions', they subscripted four types of question; and to 'Teacher gives directions', they specified cognitive and managerial directions. The occurrence of a behaviour was thus acknowledged not to be the only thing to notice. The specific nature of the behaviour or the context in which it occurred was also recognized as important. The modifications aimed to make clearer distinctions between what are gross differences or categories and to take account of aspects of the contexts in which they occur.

The Flanders Interaction Analysis Categories, dating from the late 1950's served as the model for these systematic observations of prespecified, discrete behaviours. Although modified over the last decade in the ways described above to include contextual aspects, these category systems apply predetermined criteria to the classroom which screen off other, possibly significant criteria (Delamont and Hamilton, 1984). As early as 1968, Smith and Geoffrey pointed out that:

> The way (the teacher) poses his problems, the kinds of goals he is trying to reach, the alternatives he weighs...are aspects of teaching which are frequently lost to the behavioural oriented empiricist who focuses on what the teacher does, to the exclusion of how he thinks about teaching. (p. 96).

Coding systems verify concepts and models rather than generate the ground from which concepts and models may be built. They build-in interpretation of the observed events. Since we were unable to determine in advance precisely which behaviours would be affected by the problem-focused coursework and did not wish to make advance interpretation to exclude the possibility of change in unexpected directions, coding systems in this tradition seemed inappropriate.

Holistic Approaches

Over the last decade, ethnographic techniques derived from anthropological and sociological traditions, have increasingly been applied to the study of classrooms. These techniques seem particularly useful for analysis of the complex activity of teaching with their emphasis on a) the importance of context, b) the need for detailed records and descriptions in field notes, interviews etc., and c) the impact of the perspectives and attitudes of the observer/researcher on both the observation and interpretation of data.

Importance of context. Teacher behaviour cannot be properly understood or described separate from the setting in which it occurs. In an explanation of their methodology, Smith and Geoffrey (1968) argue for the teacher's role as participant-observer, since the teacher 'usually knows why he proceeds as he does.' Why, for example, the teacher switches topics in what appears to be arbitrary fashion cannot be understood by observation alone, but requires consultation with the teacher who can explain his behaviour.

Mischler (1979) cites Delamont's work (1976) in using Flanders' (1970) system to collect interaction profiles on a number of teachers.

> (Delamont) demonstrates that an adequate understanding of the meaning and significance of profile differences for classroom behaviour and learning can only be provided through information about the contexts of behaviour: the subject matter taught, the physical setting of the classroom, the personal 'front' of the teacher, and student opinions and interpretations of teacher behaviour. (Mischler, 1979)

Such information about context, provided that it is both sufficient and relevant makes it possible 'to make sense of the situation -- specificity and reactivity of interactive teacher behaviours' (Burns, 1984). The problem for the researcher is not to focus on identifying and controlling variables, but on methodically gathering the appropriate contextual data.

Data collection. To capture enough of the relevant information, data need to be collected in a variety of modes and from all the pertinent sources.

A full description of teaching activity can be achieved through what Geertz (1973) has termed "thick description," a detailed, concrete reporting in field notes of what is observed. These observations can be corroborated and fuller understanding arrived at through interviews with key informants. Jackson (1981) interviewed children immediately after observation to assess his own interpretations. Sondra Perl met with teachers after each period of observation to discuss her notes and perceptions of their teaching of writing (Perl, 1983).

In their study of the "Introduction and Integration of Classroom Routines by Expert Teachers", Leinhardt, Weidman, and Hammond (1984) collected data by means of detailed observational logs, videotapes followed by stimulated recall sessions, audiotapes, and extensive interviews on teachers' planning, knowledge of subject matter, perception of students, and general educational orientation. From their accumulated data, they developed a matrix mapping the relationship between routines and activity structures. The interviews afforded insights into teacher thinking about these routines and activities which corroborated or explained what was observed. The metaphor for teachers in the study was choreographers or directors.

David Hamilton, in his study of five year olds during their first days of primary school (1977), kept a longhand record of the general flow of classroom events and daily typed up a transcript of these notes for the teacher to respond to during a follow-up interview. He also interviewed at least one parent of each child. The field notes and information from parent interviews were written up separately from the interpretative commentary which derived from the dialogue between the teacher and the observer.

Beynon and Atkinson (1983) studied a group of 11-12 year old boys during their first few weeks at a British secondary school. They wrote observational notes and also tape-recorded lessons. Their observations were followed by extensive interviews wih pupils and teachers, individually and in groups. The pupils during these first weeks at school engaged in a process of "sussing out" each teacher, that is, determining what kinds of behaviour the teacher will tolerate, as part of the more general process of constructing classroom identities and reputations. The observed interactions were interpreted by the teacher and the participating students from quite different perspectives. What a teacher might see as "inexplicable and aimless" pupil behaviour could sometimes be rationally explained by the pupil.

The in-depth interview was used by Bussis, Chittenden, and Amarel (1975) in their study of teachers' understanding. They assumed that teachers' underlying beliefs and perceptions about teaching and learning have "persuasive effects on their behaviour" and they constructed an interview to elicit these beliefs. The teachers' responses were then coded. The coding schemes structured and organized the responses, defining what was looked for and what could be learned from the data. Thus, for example, analysis of views of curriculum yielded codes about cognitive and personal/social priorities. These priorities, matched to teacher's classroom behaviour, could be seen as reflections of that behaviour.

The researchers coded the interview responses of the sixty teachers by listening directly to tapes and writing summaries, retaining much of the original phrasing, which formed the basis for the codes. Patterns of thinking emerged for each individual teacher which showed a "considerable degree of consistency." Later classroom observation of a subsample of the teachers confirmed that the understanding which had been evident in the interview had "visible counterparts in the classroom." The study made clear the valuable contribution both the in-depth interview and the coding schedules could make to interpreting and describing teacher behaviour.

Participant observer effects. The perspectives and attitudes of the observer/researcher in ethnographic enquiry are an integral part of what is being studied. As Schatman and Strauss (1973) describe it:

> the observer is an outsider in an otherwise "inside" world. He too becomes caught up in the situation he has set out to examine, and undoubtedly he knows his presence changes the situation. He develops strategies for mitigating, accounting for, or otherwise taking advantage of the effects of his presence. (p. 13)

The observer must be seen to provide authentic representations, and to reach reasonable interpretations and conclusions. Miles and Huberman (1981) urge qualitative researchers to make their thought processes and their procedures explicit. "We need to be confident that ... another researcher facing the same data would reach a conclusion that falls in the same 'truth space'."

Although participant-observer data is high inference in nature, it need be no less objective than low inference data when interpretative methodology reveals clearly the line of reasoning followed and the material substantiating it. The data gathering methods of ethnographic research reflect the interactive relationship between participant-observation and interpretation. Patterns and meaning emerge from the processes of recording and analysing the data.

While none of the studies reviewed offered a model that was directly applicable to our investigation, we preferred those which attempted to use several data-gathering methods. Understanding the teacher's perceptions as he or she articulated them and fully documenting classroom activity seemed to offer a view of practice which recognized intentions as well as behaviour. The literature reviewed showed clearly the limitations of decontextualized observation instruments as means of coming to understand classroom complexity; yet it was also clear that descriptive data must yield to classificatory techniques to be manageable and coherent. A detailed description of the methods we selected is offered in the section on procedures.

PROCEDURE

The research project involved examination and analysis of a particular in-service education model and its effects on classroom teaching practice. In the following sections we describe the in-service education model being examined, the data sources and methods of collection, and the analysis.

The Problem-focused Coursework Model

Background and Development

The problem-focused coursework model was developed at Simon Fraser University as part of an undergraduate program in the Faculty of Education. As a vehicle for classroom change, the model combines two general approaches: rational empirical and normative re-educative. Chin and Benne (1976) describe rational empirical strategies as those which are most frequently used by men and women of knowledge who assume that people are rational and that they will follow their rational self-interest once it is revealed to them. If a change can be shown to be desirable and effective to a teacher, then, the argument goes, that person will adopt the proposed change. Normative re-educative strategies, on the other hand, are based on the assumption that patterns of action and practice are supported by sociocultural norms and commitments by individuals to these norms. Change will occur only as people are brought to change their normative orientations from old patterns and develop new ones.

The problem-focused coursework model offered at Simon Fraser University includes elements of both change strategies. The first component was a fall term methods course with a primary focus on theory and demonstration of improved classroom practice in a particular instructional area. This component was seen as having a rational empirical orientation. The second component was a spring term problem-focused seminar with training in implementation and action research designed to equip the teacher to identify teaching problems and to begin taking steps to solve them. The third component was the problem identified by the teacher. A faculty member and a faculty associate (a practicing teacher seconded from a school district) assisted the teachers in these latter two stages. The activities occurring in the spring semester combined both strategies but were oriented more towards the normative re-educative approach.

Table 2 shows the nine teachers who began the project and which courses they took during the winter semester of 1985. It also shows the grades they taught, courses recently taken, and projects undertaken. The problem-focused seminar which is described below was taken by six of the teachers involved in our research. All who were involved in Education 406 on campus participated in the five sessions described below. The two who participated in the professional in-service practicum (district program) did not take part in the problem-focused seminar. Those who were enrolled in Education 361 also participated in the problem-focused seminar because it was part of that course.

Education 361 was a three-hour undergraduate credit course. The course included readings, lectures, and seminars dealing with change and implementation. The five training sessions which constituted the problem-focused seminar were incorporated into that course.

The Problem-Focused Seminar

The seminar component of the problem-focused coursework model was designed to provide the teachers with an opportunity to examine the problems and issues of implementing improved ideas into schools and to gain some understanding of the literature involved. During six sessions, the following topics were addressed:

- problem identification
- implementation
- action planning and action research
- models of successful classroom change
- evaluating the effects

In addition to these main topics, a number of additional areas such as change theory, support systems, the transfer and use of knowledge, barriers to change and local case studies were touched upon. We provide a brief overview of the first two sessions. A detailed account of the five sessions is available.[6]

Session #1 - Problem identification

The students were given an overview of the five sessions and a philosophical orientation was provided. The remaining time was devoted to how one attempts to identify problems in one's teaching.

The following points were presented and discussed during this session.

- The notion of 'a problem' was presented as a positive rather than a negative concept. It was described as a discrepancy between an ideal condition and one that currently exists. The participants were asked to describe how their classroom would look if they could achieve some condition or practice that represents some kind of ideal. We asked "Imagine yourself a year from now. You are observing yourself as a teacher. What would you like to be doing?"
- We discussed the assumption that they were interested in improving some aspect of their classroom practice. In other words, the present state of affairs is not the ideal. We identified as a logical starting point the courses that they had taken in recent semesters. Were there

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[6] Contact M.F. Wideen, Faculty of Education, Simon Fraser University, Burnaby, B.C., Canada, V5A 1S6.

discrepancies between what they were now doing and what the input from these courses suggests they should be doing?

- Another assumption discussed was that change is a natural human process.
- Traditional needs assessment has not been very useful in assisting teachers to make changes in their classroom practice. Typically it has taken on the trappings of a process designed to educate teachers to their professional responsibilities to schools and children. Our focus was to be on them as teachers. What did they need to become better professionals within the context of their work?

Following the presentation and discussion of these points, one of the instructors described a problem situation he had encountered in his teaching at the university. His problem was discussed by the group and suggestions were made as to how he might work to resolve it.

Working in pairs the participants used notions of their current state, a desired state, and steps to move from one to the other to guide their thinking in considering a problem in their own teaching. These problems were later discussed by the entire group.

Session #2: Implementation

The students first discussed Chinn and Benne's paper "General change strategies for effecting change in human systems" (1976). They were then presented with the concept of implementation and its importance in bringing about change. The students then discussed eleven scenarios which are appended, attempting to classify them as to whether they were conceptual, organizational, behavioral, technical, or trivial. (See Table 1) They were also asked to rank them according to their level of difficulty. Other topics such as barriers to change, knowledge use, regularities of practice, and normative perceptions of students, parents, and other teachers were also presented and discussed.

Table 1: INNOVATIVE SCENARIOS

1. A college instructor describes how she would reorganize a program for the preparation of technologists. It would require input of academic content during supervision rather than the presentation of lectures.

2. The University of R introduced a program for beginning teachers in which all methodological courses occurred over the entire degree program rather than being concentrated during the second year.

3. A principal and staff are meeting to discuss problems encountered during the first month of having introduced a bank of computers into the school which is circulated from room to room.

4. Mr. R.W. distributes a revised set of readings to his philosophy class which are intended to better integrate theory and practice.

5. A principal reports to an administer's meeting how his school resolved the noise problem in his school by a new arrangement of staggering the times when students entered the school in the morning.

6. Mr. M. is working to spend less time lecturing to his students and provide more time for discussion in small groups.

7. A group of teachers is meeting to review their success in introducing selected aspects of the ITIP program into their teaching.

8. A chain smoker discusses her first week of having gone "cold "turkey."

9. A new pattern of seating arrangements is being discussed by a group of instructors, one of whom had introduced it into his class last week.

10. A new set of texts in language arts was introduced into the schools in B. last September.

11. A student in a program of teacher preparation realizes during a lecture that a completely new approach to teaching mathematics compared with the one he experienced in high school is available for use.

Table 2: BACKGROUND INFORMATION ON RESEARCH PROJECT TEACHERS

Pseudonym	Grade Taught	Courses Taken Winter, 1985	Recent Courses Taken	Project, Winter 1985
Clark, Patricia	3	ED 406[1]	Designs for Learning the Natural Sciences	Using science as an opportunity to develop thinking skills
Davis, Martin	Special Ed., Intermediate	ED 406[1] ED 361	Designs for Learning the Natural Sciences	Using a "hands-on" approach to science to see if it would affect students' attitudes
Dobol, Tara	11, 12 Art and English	ED 406[1]	Learning Disabilities	Developing a painting unit for use with individual contracts
Marshall, Deborah	3	ED 361	Designs for Learning the Natural Sciences	Teaching thinking skills and changing her classroom function to that of a facilitator
Mills, Barbara	K-1	ED 406[1] ED 361	Designs for Learning the Natural Sciences	Using a "hands-on" inquiry approach to the teaching of science
Sewell, Wyona	Social Development Class	ED 406[2]		Reading aloud in the classroom and tracing its affects on a single child
Vernon, Laura	K	ED 406[1]	Early Childhood Education: ED 464	Integrating her style of teaching with the new kindergarten curriculum; using cross-curricular themes.
Campbell, Megan	3	ED 406[2]		Language experience (incomplete because she became a head teacher)
Kerslake, Helen	2-3	none	Designs for Learning the Natural Sciences	Using discovery learning in science (incomplete because she did not enroll in ED 406)

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[1] ED 406: The Problem-Focused Seminar

[2] ED 406: Professional In-Service Practicum

Sessions #3 - #5

The remaining three sessions dealt with the other topics listed above. The sessions were designed to encourage teachers to take ownership of their problems which varied considerably as they were totally of the teachers' own choosing. Even the model itself was adapted to suit individuals. Although one teacher who took the science methods course in the fall term did identify science teaching as her problem focus, another teacher who took a course in learning disabilities in the fall term developed an individualized art program as her project for the problem-focused course. (See Table 2)

Data Sources and Methods of Collection

For this research project we collected data from one main source and four adjunct sources. The main source was seven teachers who agreed to have their classroom teaching observed and to participate in intensive case studies. The other sources included principals and colleagues of the research project teachers, the Faculty Associate who worked with the research project teachers, five teachers who participated in another type of in-service coursework, and seventy education students who completed a questionnaire about in-service education.

Several different approaches were used to gather data.

The Research Project Teachers

Composition of the group. Nine teachers initially formed the study group. They volunteered to be part of the research project at the time they enrolled in Education 406, the problem-focused seminar, scheduled in the January to April term at Simon Fraser University. They were informed about the research project through an information sheet circulated to them during the September-December term. (See Appendix B for a copy of the circular.) Observation of two of these teachers began in November, while they were still taking a curriculum and instruction course in science education. In the case of the other seven, initial observation did not begin until the early part of January, as they started the problem-focused course. One teacher who had initially expressed interest and who had been observed in November had to withdraw from the project when financial problems prevented her from enrolling in Education 406. Rather than discard descriptions of her class, however, we observed again at the end of the project to see how changes in her teaching compared wih changes made by the project group. Another teacher, both enrolled in the course and a participant in the research project, had to withdraw from the project when she was promoted and reassigned as a head teacher in another school in the middle of the school term. Although we have baseline data on her, we were unable to collect data after the completion of Education 406 because she was no longer in her classroom.

There remained, therefore, seven teachers who were studied over the course of a six month period. We observed their classroom instruction, recorded their involvement in the problem-focused coursework model, and made an attempt to monitor the interaction of their activity and that of other people within the school. The teachers ranged in age from early 20's to early 40's; they had from one to eighteen years of teaching experience; six taught in elementary school (kindergarten through grade 3 and learning assistance classes) and one was an art teacher in an alternate high school. A detailed case study of each teacher is included in the next section of the report.

Observation framework. We interviewed the project teachers prior to the beginning of problem-focused coursework in January. They talked about their own teaching practice, their attitudes toward research, their expectations of the course, their perceptions of themselves as teachers, and their approaches to handling problems in their teaching. A copy of the interview protocol is included in the appendix.

Before the problem-focused course was well underway, each member of the research team made four or five visits to the classrooms of the teachers he/she was to observe. We tried to precede each forty-five to sixty minute visit with a brief discussion about what was to be done in the class during the lesson and to follow the visit with discussion to review and explain.

The instructional activity observed was primarily in the subject area that was to be the focus of the particular teaching improvement plan. Because we wanted to establish teaching regularities, however, we did observe other subjects as well; and, for the collection of baseline data, we discouraged discussion of specifics of the problem the teacher was identifying.

We recorded our visits to the classroom through full notes and audiotape transcripts. Because we did not know exactly what we would see, we did not feel we could go into the classroom with a fully-predetermined instrument. On the other hand, we wanted to have some means of focusing on behavior in the classroom that might help us articulate individual teachers' patterns.

> Some direction is needed -- but not too much; it is important not to foreclose on other ways of construing and addressing the main research issues that the field site can disclose (Miles and Huberman, 1984, p. 42).

Therefore, from the literature on classroom observation and from our own experience as classroom teachers and supervisors of student teachers, we tried to strike a balance by outlining seven clusters of things to look at in the classroom. The clusters include role of the teacher, nature of the class, planning, role of the student, interactions, evaluation, and organization of the class. We determined subtopics within each of the clusters and guidelines for what to look for in the classroom. Copies of these observation schedules are included in the appendix.

Although we had determined the clusters before we began the observation, we tried not to prematurely assign classroom behaviours and interactions to the clusters because we felt that too much stress on these particular groups of behaviours would tend to make us ignore classroom occurrences that did not apear to fit into a cluster. In a 1975 study Mash and Makohoniuk showed that recorders tended to ignore potentially important behaviour in their efforts to record patterns. We did not want our framework to cut out any of the richness of the classroom.

Therefore, we wrote notes to relate, as accurately and fully as possible what the teacher did during the lesson and how the students responded. After each session, we transcribed the notes of our thick-focused description (Geertz, 1973) to make a full written account of the lesson including the classroom context and what both the teacher and the students did and said during the lesson. We then gave a copy of each description to the study teacher for comment and/or correction.

This submission to the teachers of the descriptions was one of our means of correcting errors or misinterprtations. We also attempted to mitigate idiosyncratic, selective observation and bias in our recording of observations (Kent & Foster, 1977) in other ways. Although members of the research team were not paired for reliability checks (Kent, O'Leary, Diament, and Dietz, 1974), we made sure all teachers were observed by at least two of the researchers. Most were seen by all three. We used transcripts of audiotape recordings to mitigate observer selectivity in recording classroom language. In addition, each member of the team received copies of each thick-focused description and transcript for discussion at weekly team meetings. Questions were raised about what went on in the classroom (if the description was not clear), and the observer was asked to provide specific evidence for any interpretations in the description.

Concurrently with the observations, we recorded other interactions between the project teachers and the research team. These included telephone conversations, chance meetings at the university, and arranged discussions when the teacher and team member would review the lesson or observation record. These interactions were written up on contact summary sheets (Miles and Huberman, 1984). (See Appendix D for a copy of a contact summary sheet.)

The research team met regularly to discuss our observations, and to examine each others' notes and comment on their clarity, detail, and focus. The first set of observations formed the baseline data on the seven teachers.

Two or three weeks following the completion of the problem-focused course, we began a second series of observations. In contrast with the collection of baseline data, in the second series of observations we observed only those lessons in which the teacher was attempting to resolve a problem with the help of the problem-focused course.

The same methods were used: thick-focused description, tape recordings, and contact summary sheets. In addition, four of the teachers were videotaped and then encouraged to discuss the videotape playback with the observer. In this stimulated recall situation, the teacher and observer could together describe what was happening in the class and consider how closely the teacher's intentions matched his or her behaviour and perceptions of the class.

At the end of the problem-focused course, all the students, including those in the research project, evaluated the course anonymously by answering a questionnaire. (See Appendix F for a copy of the questionnaire.) In addition, we interviewed the teachers in the research project about their problem focuses, how they felt about them, what changes they had observed in their classrooms, and whether or not they would continue to implement the changes they had begun. The interviews were audiotaped and transcribed. A copy of the interview protocol is included in the appendix.

Adjunct Sources

Brief interviews were conducted by the research team with principals and a few colleagues of the seven teachers involved in the research project. We also interviewed the Faculty Associate who had worked with these teachers after the problem-focused seminar was completed. In addition, we interviewed five teachers enrolled in a different type of school-based in-service education course; we used the same questions we had asked of the project teachers in their final interviews.

As an adjunct to our main research study, we administered a questionnaire about in-service education to a selection of students who were taking education courses designed for practising teachers. Information from all these adjunct sources is included below in the results section.

Analysis of Data

The data were analyzed through qualitative rather than quantitative procedures since they were comprised of mainly verbal reports from interviews and observation.

Analysis of Data from the Research Project Teachers

We examined baseline data to establish the typical classroom teaching pattern of each teacher. We carefully read the data and identified specific details or points that clustered around the categories we had previously outlined as being typical of classroom practice. This clustering facilitated the identification of individual themes or patterns, a process not unlike Glaser and Strauss' (1967) notion of the discovery of grounded theory. Here we found the approach used by Doyle, 1983, helpful for discovering classroom regularities. We developed mini-theories grounded in the observation of individual teachers.

To the original clusters -- the role of the teacher, planning, the nature of the class, the role of the student, interactions, evaluation, and organization of the lesson -- we added "view of and attitude toward the subject" as we saw that that factor appeared to be important in terms of the time spent on subjects and the confidence with which they were presented in the classrooms.

As we observed the teachers, we found it useful to think about their behaviour in terms of the various functions they perform. We referred to these functions under the category of "role of the teacher." We chose to use the word "role" in describing the ways teachers and students function in the classroom not because we believe that they are "acting" but that, subconsciously or consciously, they have learned to behave in certain recognizably "teacherly" or "studently" ways. It is common for teachers to conceive of their roles in the classroom as those of information giver, facilitator, disciplinarian, helper, evaluator, counsellor, friend, organizer, manager, discussion leader, among other roles. And students can function as recipients of information, trouble-makers, helpers, test-takers, counselees, friends, quiet workers, leaders, followers, participants, initiators, or even class-clowns.

As we studied the data, we noticed repeated instances of particular kinds of behaviour. For example, we observed that one teacher acted as both teacher and counsellor whether she was teaching art or English. In another case, the discussion of learning tasks consistently involved teacher/student or student/teacher with few instances of student/student task-oriented interaction. Our data were consistent with other research findings (Doyle, 1983; Miles, 1984) that most teachers follow certain procedural regularities that are fairly stable.

We then wrote a profile of each teacher's patterns as derived from the baseline data. These profiles of teachers' patterns were given to the subjects for their comments and ammendments before final versions were written.

Following the second set of observations, we looked at the new data and noted changes. Obviously little or no change was expected in the nature of the class, but information about the class was important for the context within which the teacher was working. However, depending on the problem the teacher identified, we expected to see some changes in such areas as the role of the teacher, planning, the role of the students, interaction, evaluation, and organization of the class. If a major shift occurred, we also anticipated a change in the teachers' views of or attitudes toward the subjects. For example, several of our subjects are female elementary teachers who felt insecure about teaching science. If their experience with the problem-focused coursework helped them develop effective science lessons for their classrooms, we expected they might have different views of science as a subject.

As we began the analysis of change, we juxtaposed baseline and post-intervention data to determine whether or not any change had occurred in the patterns. We noticed change in a crude sense and went back to the original observation notes to confirm the exact nature of the change. We needed to make sure that our thick-focused descriptions and analyses of clusters allowed us to see changes that did occur and not to "create" changes that did not really occur [the question of validity (Kent and Foster, 1977)]. We analyzed old and new notes, justified our notions of change to the research team, reflected and interpreted.

From the original teacher profiles developed from the baseline data and from the analysis of changes, we wrote descriptions using details from both baseline and post-course data. These descriptions turned into full case studies of the seven project teachers. Although we had not intended to write a full case study of each teacher, we decided to do so because each teacher's situation was so different. The teachers taught at different grade levels in different contexts; they chose different problems to work on; and their teaching styles, experience, motivation, and response to feedback also differed widely.

The case studies of the teachers include descriptions of the teachers' professional backgrounds, the contexts for their participation in the research project, the school and class contexts, their patterns of teaching before the beginning of the problem-focused coursework, including illustrative examples and analysis, and the changes observed after the completion of their projects. In writing the case studies, we integrated the "nature of the class" cluster into the opening section of the case study as "Class Context," and we incorporated "view of and attitude toward the subject" under the "Teacher's Professional Background" section. Although the primary observer of each teacher wrote the text of his or her case study, the two other researchers challenged points and asked for evidence of conclusions. The final drafts were approved by all three researchers and were sent to the teachers for their corrections and comments six months after observation had concluded. These case studies are included in the results section of the report.

Analysis of the Reactions of the Principals and Teacher Colleagues

Although we had hoped to study the interactions among the project teachers and their principals and colleagues, we have so little information that we are unable to draw any conclusions and are omitting this data.

Analysis of the Interview with the Faculty Associate

An interview with the faculty associate was not held until after the problem-focused course had concluded and after all classroom data on the project teachers had been collected. His comments corroborated what each project teacher had chosen for his or her problem. He was also able to describe in detail exactly how he helped each teacher in the classroom. Many of his comments are included verbatim, and we have related his experiences and conclusions to the literature on in-service coaching or mentoring.

Analysis of the Interviews with Five Teachers in Other Projects

Since we administered the same interview protocol (see Appendix G) to five teachers in another version of ED 406, we are able to compare their reactions to the types of help they were given in their classrooms with our project teachers' reactions to the problem-focused course and their opportunity to have the Faculty Associate in their classrooms. We related our findings to research on university coursework and on mentoring.

Analysis of the Questionnaire

A detailed summary and tables report the results of the questionnaire administered to 70 students in "design for learning" courses in the fall term of 1984 at Simon Fraser University. These courses are curriculum and instruction courses designed for practising teachers to improve teaching skills and understanding in particular curricular areas. The tables include quotations from the responses to individual questions. Responses are related to the literature on attitudes toward in-service education and to the responses of the research project teachers.

RESULTS

In this section we detail the results of our study. The first part includes full case studies of the seven teachers involved in the research project and two teachers whose participation was abbreviated. We then summarize the changes in the classroom teaching of these teachers. The next part is comprised of results from interviews and the questionnaire.

These detailed case studies are divided into parts which correspond to the clusters we used when we were observing the teachers. They also include references to the initial and final interviews conducted with the teachers. For an explanation of how we wrote the case studies, see the procedure section above.

CASE STUDY: Patricia Clark

Teacher's Professional Background

Patricia Clark has been teaching elementary school for 18 1/2 years. She trained in England in a two-year program in a teacher training college for 2 years before moving to Canada and taught for a few more years before stopping to have and raise her children. When she resumed teaching in 1972 she started as a learning assistance teacher, the first appointed in her district for intermediate grades. She also enrolled in Simon Fraser University to finish her degree and took courses in reading, remedial reading, and learning disabilities. She completed her Bachelor of General Studies degree in 1985 with a minor in learning disabilities.

After ten years as a learning assistance teacher, Patricia became a regular classroom teacher three years ago. The first year she taught she worked to bring language arts, as she put it, "under control." In her second and third years she worked on math and social studies. Of the academic subjects, science is the one that Patricia has felt least comfortable teaching. In the past her teaching experience and her work in learning assistance have helped her feel confident about math and language arts, but in science she has not felt that she knew what to teach or how to teach it. The curriculum guide in science and the textbooks have not been very helpful to her.

Over the years Patricia has taken various in-service workshops. She was particularly impressed with a creative writing workshop which led her to introduce more frequent creative writing in her class. Her school district has encouraged ITEP, based on the work of Madeleine Hunter. Patricia feels some of the aspects of the program are valuable, but she says that the program is not applicable to all teachers or all classrooms at all times.

Context for Teacher's Participation in the Research Project

In the year of the project, Patricia said, "this year I decided to 'fix up' my science." She took a course entitled "Designs for Learning the Natural Sciences" (Education 476) at Simon Fraser University in the fall term of 1984 and followed it with the problem-focused course in the winter term, during which she worked on implementing the new (to her) ways of teaching science. She also wanted children to develop a positive attitude toward science that would carry through to their high school years.

Patricia was also interested in helping children apply some of the thinking skills they would learn through science lessons to other subjects. She hoped that some of these thinking skills, such as observation and analysis, would be generalized to apply to like outside schools. She mentioned that she hoped children could learn to be more discriminating about television programs, for example, and would learn to think independently.

Although Patricia was eager to enroll in the problem-focused course, she says she was very reluctant to participate in the research project that was designed to evaluate the problem-focused course. Her reluctance was based on her self-knowledge of her feelings about being observed. She said she has never been comfortable having an observer in the classroom, although she is perfectly happy to have other adults in the room. She makes frequent use of parent volunteers, and the principal drops in occasionally for brief periods. She suggested that her negative reaction to being observed may be a result of her unpleasant experiences with her first supervisor in England.

Patricia's discomfort with being observed was obvious during the first observational visits by the research team. She mentioned that the taking of notes, in particular, made her ill at ease. Therefore, in one class early in the term, the researcher agreed not to take notes but to help with the class as if she were a volunteer. Halfway through the class Patricia told the observer, "Go ahead and take notes."

Patricia also became more relaxed when she had seen the researcher's descriptions of her classes and realized that they were not evaluations. She did not mind having the class audiotaped; in fact, she often volunteered her own tape recorder. Therefore, in later visits, the researcher took only very sketchy notes, mainly setting the context or identifying children who spoke, and the description of the class was transcribed from the tape. Despite some improvement in Patricia's ease with being observed, however, she had considerable anxiety about being videotaped and only reluctantly permitted one videotape recording of her class. The children were very interested in seeing the videotape, but Patricia showed them only enough of it so that they could all see themselves. She did not want to view the whole tape herself. She said she knew what was wrong with her planning and she knew the video camera had made her nervous.

School Context

Patricia taught grade 3 during the year of the project in a 540 pupil elementary school in a small, semi-rural, semi-suburban town twenty miles from a large metropolitan area. More than half of the classes are French Immersion with students coming from a large area of the school district. Students in the English section are drawn from the neighbourhood.

Patricia described the principal of the school as supportive in that he encouraged her to take courses and permitted the research team to gather data in the school. He did not actively help Patricia with her project nor was he available for any detailed discussions of what Patricia was doing with the teaching of science. Patricia described the staff as friendly but said that they did not often share ideas about teaching. However, Patricia did team-teach music with a first grade teacher to both their classes.

Class Context

The grade 3 classroom contains several areas for activities. Children sit in table groups of four to five desks moved together. They gather to sit on the carpet at the side of the room for full-class instruction or to listen to stories. Separate tables display art materials and library books. The chalkboard lists daily questions for reading groups, and children's art and written work are posted on the walls. A portable chalkboard screens the instruction area from the doorway and doubles as a visual aid for the full-class instruction.

Patricia described her grade 3 class as being average to well below since the brighter students in that grade level were placed in a split 3/4 class. These children were observed to know the routines and to do straightforward tasks quite well, but not to make insightful connections. They sought right answers and were eager to participate at the chalkboard, reading out loud, or giving answers. They were friendly and open with visitors.

Patterns Observed in Baseline Data

Role of the Teacher. Patricia is the centre of all aspects of the classroom. She describes herself as playing a traditional role, by which she means that she plans and organizes all the classroom activities: academic, procedural, management, and social. She directs the learning, sets the assignments, plans and asks questions, and organizes what the children do in large groups, small groups, pairs, or on their own. She limits student choice to certain areas of the curriculum such as art, music, or "show and tell."

Patricia stresses that she wants to help the children in social as well as academic ways. She insists on politeness in behaviour and language among themselves and to teachers and classroom visitors. She commented that some of the children have difficulties at home which affect their behaviour in school.

Planning. Patricia plans the activities, sequences them, and prepares the materials and questions she will use. She takes her ideas from a variety of sources: university courses, in-service workshops, instructors' manuals, textbooks, and her own experience. For lessons such as the ones we observed, examples of materials included plasticized pictures of animals and worksheets for animal identification exercises and individual question cards for language arts. Several language arts lessons included planned questioning of the whole class to elicit generalizations, categories, and ways of classifying. When three words were put on the board, "sparkle, groan, mumble," the children were asked to decide which two words went together and to say why. Patricia had planned the lesson segment and chosen the words to help the children learn to see similarities and differences. In this case a child said the teacher should keep "groan" and "mumble" together because "They're noises people make."

Role of the Students. In the classroom situation the children play the traditional role of students very well. They sit quietly and they do what they are told, most of the time. They know the routines and show responsibility for such things as cleaning up. They are also generally well-disciplined, but a few children have been asked to sit by themselves rather than in table groups because they have not been able to work well with others close to them. Occasionally some of these children make facetious remarks, as when Mark commented that a cow can give sour cream.

The children willingly discuss things they know about, such as pet frogs, in some detail; and they answer straightforward recall and some levels of comprehension questions. They are less confident when they are asked to interpret. For example, in a reading group, when the children were asked about how Marianne (a character in the story) is feeling, they appeared to think they could recall or find the answer in the text rather than compare her plight to how they might feel in a similar situation.

Interactions. Most interactions are teacher-student (teacher asks questions or give directions) or student-teacher (students answer questions or asks the teacher what they are supposed to do). The children are polite in listening to the classmates' answers. They react nonverbally through intakes of breath if the answers are right or wrong, but they do not respond with questions or requests for further information. They don't seem to take account of each other's answers. They appear to believe that only interactions with the teacher are important.

That the children do not often listen to each other in the large group was shown on an occasion when Patricia asked them to each tell the class what he or she planned to do at the school Mardi Gras this evening. Each child was supposed to mention something different. By the time five activities had been mentioned, children who had had their hands raised from the beginning said exactly what they had planned to say, even if that particular activity had already been mentioned.

There was some interaction among children during "show and tell" or similar situations when they asked questions of the speaker. The boy who talked about his pet frogs was asked, for example, what he fed them, what their names were, and what eventually happened to them.

Disciplinary interactions with individuals are low-key but pointed: "I'd like to ask Ryan, but he's not sitting down." Table groups are rewarded for good behaviour or quick clean-up by being allowed to get coats or lunch boxes first.

Evaluation. Correct answers are continuously evaluated. Children self-check math exercises, Patricia or an aide checks language arts notebooks, and Patricia usually checks words or pictures children have indicated on the chalkboard. Through questions like "How many think she's right?" Patricia discovers how many children have "got" a particular answer. Individual answers are reinforced if they are correct: "Tania, I think you're right." If the answer is incorrect, Patricia often asks, "Anyone have another idea?"

Organization of the Class. Classes typically begin with instruction followed by time for questions, and then seatwork with individual help available. Frequent changes of activity accommodate short attention spans and restlessness. Patricia uses two reading groups with basal readers and has enrichment and development questions available for individuals. Art and music are less tightly structured, and students often choose what they will do or sing.

Illustrative Example and Analysis

Before Patricia enrolled in the problem-focused course, I observed her teaching a lesson in a science unit on mammals which included identifying mammals and classifying them according to various characteristics such as size, habitat, diet, outer appearance. She used plasticized pictures of mammals and asked the children to figure out what classification principle she was using when she put the pictures of certain animals on one side of the board and others on the other. When children thought they understood the classification principle, they were to put up their hands.

The first principles were relatively easy to derive; for example, Patricia put large animals on one side of the board and small ones on the other. By the end of the sequence of demonstrations, however, the last classification principle, based on what various mammals typically ate, proved very difficult for the children, possibly because they could not observe the eating habits from the pictures.

After the whole class exercises, the children moved by table groups from table to table where they answered worksheet questions about animal pictures spread out on each table. The pictures were not all of mammals: some questions were aimed at helping children distinguish between mammals and other animals; others asked about characteristics of mammals such as the fact that mammals bear their young alive.

While the general goal of the class appeared to be that children learn about mammals and about classification, the purpose of learning particular facts about mammals or even the purpose of learning to classify could not be derived from observation of the class. Any one fact about mammals seemed to have the same importance as any other, and the principles of classification also seemed arbitrarily chosen. At one point in the lesson Patricia had told the children that mammals have four-chambered hearts, and one of the worksheets referred to this characteristic. However, since hearts are not visible, and since the children did not know much about the anatomy of hearts, this question appeared to be too far outside their understanding. It was also unclear how this fact about mammals related to the purposes of classifying.

Changes Observed in Patterns

The changes in Patricia's science teaching patterns are evident to a greater or lesser degree in most aspects of her classes. As was her intent, she has maintained her relationship with the children and the overall organization of class activities.

In the science classes Patricia relinquished some of her central role and structured the classes to allow more student participation. She still organizes the classes and sets the learning objectives, but she allows the children to do some of the demonstrating and encourages them to work in groups, repeating the experiments, observing, and discussing. They record what happens through prose that is later read to the class, through graphs (thus connecting the science learning with math skills), and through drawings. Patricia is available to help the groups as they work, and she has organized an aide and grade six children to help the groups (at least for the candle experiments which have a safety hazard associated with them).

Patricia still prepares all materials ahead of time, but in science they now include the actual equipment for doing experiments (candles, water, jars, matches, pieces of cloth, etc.) rather than pictures, textbooks, or worksheets. Learning goals can be derived from the lessons, and the activities appear more purposeful even though the purposes are not explicitly stated. Nor is it necessary for children to reach pre-specified answers. When the children did not observe or comment on the colour of a candle flame just before it went out, even when they were asked specifically to do so, Patricia let it go and moved on to timing how long it took different sized candles to go out when covered by different sized jars.

The student's role in Patricia's classroom has expanded. Students actually do the experiments in science and take on group roles as leaders, recorders, and reporters. They also are encouraged to report on experiments they have done at home. They are still responsible about cleaning up, and they are still self-disciplined enough to work quite well even when the teacher is not actively supervising them.

After Patricia took the problem-focused course, student-student interactions in the science classes occurred with greater frequency. When the students are doing experiments in groups, they take turns and point out what they've observed to others. Earlier, when they worked in groups to identify and classify mammals, they essentially were working independently on their own questions.

In evaluating the learning in science, Patricia shows less concern with right and wrong answers and more concern with what sorts of questions children still need to answer. This difference is reflected in changes in her language. No longer does she ask, "How many think she's right?" Rather, her language includes such questions as, "Why do you think that happened?" "Can you figure out a way we could find out why..."

One lesson in this unit on fire and fire prevention illustrates how children learned by observing rather than only by reading or listening. Patricia asked the children to take a large sheet of paper and put a vertical line down the centre. On the left side the children were asked to draw a candle burning as they remembered and imagined how it would look. They had an unlit candle in front of them. After they had all done this, Patricia lit the candles on each table, turned off the lights, and asked them to observe the burning candles. The children immediately saw and commented on various features of burning candles which they had not previously noted or remembered, such as the dripping of the wax, the shadow the candle cast on the plate, the reddish colour of the glowing wick, and the fact that the flame was not all the same colour, particularly that it had a dark, bluish area near the bottom. The groups took notes and shared their observations with the rest of the class. Near the end of the class the children drew a second picture of a burning candle as they observed it, this time on the right hand side of the paper. Their second drawings showed the effects of the close observation and discussion.

In general the changes in the patterns of science teaching allow the children to observe, discuss, record, and make decisions about what they are learning and to know why they are doing the experiments. In the unit on fire, for example, newspaper clippings about local fires and reports of causes of fires as well as a visit to the local volunteer fire department helped the children connect their classroom learning with the world outside school.

Discussion

Patricia's project for the problem-focused course was to implement some of the discovery learning techniques she had learned in her Designs for Learning the Natural Sciences course the previous term. She wanted to improve her teaching of science.

She designed her science lessons to give children an opportunity to manipulate materials and to observe what happened. Her experience with this approach led her to realize that the children could observe and discover without her suggesting what they should see. Her science classes now allow the children to observe without the necessity of arriving at pre-set, specific answers; yet the purpose of learning to observe closely can be easily derived from observation of the classes. The children also appear to understand the purposes of the classes.

The contrast between the mammals and candles lessons illustrates the difference in Patricia's approaches to science. During the mammals lesson, Patricia had specific mammal characteristics she wanted children to learn. The information about the characteristics generally came from books, including the fact that mammals have four chambered hearts. The children had no idea what this meant, and certainly they had no observational data on which to base conclusions about hearts, as they did with many other mammal characteristics. They were trying to name an attribute which the teacher had in mind. In the post-course candle lesson, although Patricia undoubtedly had some attributes of candles in mind, it was not necessary for children to derive them all. Patricia drew their attention to the candles in front of them and asked them to listen to each others' observations.

In the other post-course science lessons, children who had done experiments at home told about them and then demonstrated them for the class. Two boys had observed that they could relight a recently extinguished candle by placing a lighted match near but not directly on the wick. They demonstrated the phenomenon in class, and Patricia encouraged them to speculate about why this would happen. Later in the class when the groups went back to their tables to do further experiments, children were invited to join Sam and John to repeat their experiment.

Certainly the post-course lessons were different. Rather than learning a set list of characteristics, children were encouraged to observe phenomena and record what they saw. From the records of these observations they could then derive generalizations about these phenomena, for example, the characteristics of burning candles. In addition, the experiments with jars and water and different fuels helped the children understand what fires need to start and stay alight and thus how they can be extinguished through the removal of one of their needs, for example, oxygen.

It appears that Patricia derived the basis for her science lessons from the Designs for Learning the Natural Sciences course. In addition, her Faculty Associate mentor from the problem-focused course monitored her class's progress and gave her feedback but did not tell her what to do. She was concerned that he did not give her enough specific help in implementing the changes she wanted to make in the science classes.

In spite of not getting as much help as she wanted, Patricia is certainly pleased with the changes she has observed in her students. She can analyze when lessons do not work as well as she had hoped and has thought of ways to improve the lesson even before it is over. During the lesson in which she was videotaped she realized that she had introduced too many experiments and that some of the groups did not know exactly what they were supposed to be doing. She commented that she might have stopped and changed direction during the class if it had not been for the fact that the class was being videotaped.

Patricia is also pleased with the potential for using some of the science discovery techniques in other subjects such as social studies. She intends to continue experimenting with these discovery methods with future classes. She said science served as a vehicle for helping children learn to think for themselves.

Patricia's Comment

The project certainly was a worthwhile experience, and it has far broader contexts than just teaching science. The problem with it, however, was that it was too short term. To do a proper in-depth study, it would have to be over time, perhaps over several years. The project made me look at myself, at my teaching. But a key word is "support"; as the only teacher in the school who was working on such a project, I needed Steve's help and it's hard to keep going without some sort of continuing support.

CASE STUDY: Martin Davis

Teacher's Professional Background

Prior to entering teacher training, Martin worked for several years in other types of work. When he decided in 1978 to obtain a teaching qualification, he enrolled in the Professional Development Program at Simon Fraser University. Having completed his training, he taught a Grade 4-5 class for 1 1/2 years and then began teaching students with learning disabilities. With his experience as a Program Coordinator for a private therapeutic centre and work as a child care counselor with children whose behaviour created discipline problems, he felt he both understood and was interested in problem children. He returned to university to upgrade his certification to Bachelor of General Studies, and to take courses in teaching learning disabled and special education children. He finished his degree in June 1985 with a minor qualification in learning disabilities.

Context for Teacher's Participation in Project

Although Martin had not been involved in a research project of this kind before, he welcomed the opportunity. In the course of taking classes at the university, he had been required to do projects that led to implementation of new ideas and was expected to monitor his own performance in class. He had done background reading for his papers and was interested in the findings of research. Although some coursework was too theoretical, he thought, and the practical implications not obvious, he is anxious to be current in his thinking and practice.

Martin expected that participation in the project would give him a different approach to use in analysing himself in the classroom, insights into what to do, and energy from the challenge of alternative ideas. He viewed it as rather like a teaching practicum, and planned to look for ideas and for feedback on how something might be improved and changed.

Normally, he reported, he uses self-observation of his teaching and careful study of his outline of work to make decisions on what to change. He evaluates himself, "mostly intuitively", by reflecting on what he has done. At the end of each year's evaluation, he tries to make changes that will "make it more learning oriented to the students". The previous year he had experimented with end of term exams in science and social studies as a way to provide a challenge for the students. He found that to be a successful method which he plans to repeat this year with a revised curriculum. He will redesign his teaching methods in science and social studies and will therefore need a different test that reflects the different way of teaching. He takes an ad hoc approach in his class and says he takes a new idea and will "throw it into the class and try it for a few months" to see how it goes. For example, he read that learning to draw in perspective would improve creative writing, so he is trying to do that.

During the early observation period, Martin's feelings about participation became somewhat ambivalent. He found being observed placed an unaccustomed and rather uncomfortable pressure on him. Although no connection between 406 course work and research project participation had been suggested to him, it appears that he had nonetheless thought that his work in the project would have direct advantages in the coursework. He asked about credit, and "accolades" he felt were owed.

The ambivalence was perhaps related too to his response to the observer's notes and tape transcripts. He was not always pleased with the image of himself that seemed to emerge and commented a number of times on the discrepancy between his self-perception and what he saw in the notes. He confirmed the accuracy of the observer's descriptions, however, and over both observation periods made few and minor changes to those descriptions.

School Contexts

The School. The school is located in a semi-rural area on the outskirts of a large city. It offers Grades K - 7 in 20 self-contained classrooms to 460 children. There are four special education teachers, one of whom works with the same age group as Martin. The staff of twenty-four teachers is, on the whole, well established, and has been in the school for periods ranging from 6-20 years.

The principal encourages teachers in self-study or university course work. The school has done work with people from the university and found it stimulating. Martin commented that the principal is interested and tries to be informed about what is going on in the classrooms, although it is sometimes difficult for her to know what is appropriate to expect from his students. He cited an example of her coming around to check notebooks for underlining and headings. Martin finds her very encouraging and wants to remain in the school while she is principal.

The Class. Martin has a special education class for eleven students aged 11-13, several of whom have a history of emotional disturbance. All have been tested on the WISC, a psychometric test of general ability, and some score as low as the 5th percentile. The reading ability, according to the tests, shows a range from pre-primary to Grade 4. Despite the range, Martin finds it less successful to have every student using a different text than to put the children in two reading groups which do similar tasks at two levels of difficulty, supplemented by the individualized work provided in such reading kits as SRA and the Merrill workbook series. Although their special needs require some individualization, the class works mainly on the same tasks in science and social studies. Little math is taught beyond simple computation since Martin finds that the children are easily frustrated with math.

The children are generally cooperative and patient with each other. Any misbehaviour is evident only in minor infractions like chatting and inattentiveness. The age difference is apparent in the greater physical maturity of some of the girls and in differences in social sophistication. The boys are small for their age.

Patterns Observed in Baseline Data

Role of the teacher. In the class, Martin functions mainly as an information-giver, organizer, manager, evaluator, diagnostician, soft-shoulder, and friend. Although he is the authority and organizer of the school day, he is also casual and open to diversions from the intended topics under discussion, and willing to discuss matters of personal consequence to students as they arise. At such times he responds by giving information that could be described as contributing to general knowledge while not directly related to the lesson. Martin perceives himself as "laid-back" and relaxed with the students. He is familiar with their home lives, their relationships with siblings and parents, and their peer relationships. He makes occasional comments on changes in the girls' appearance or boys' dress in a manner that suggests his noticing them as persons.

Through their academic work, Martin aims to have the students "learn how to learn." He wants to provide challenges and help them develop their potential beyond what is normally expected since he believes them to be capable and the expectations for them to be too low. His diagnosis is based on informal observation and is sometimes inconsistent with the results of the various formal tests he administers during the year.

The students look to Martin for confirmation of themselves as learners and persons. He gives them direction and praise and takes responsibility for their learning. He monitors what they do by walking around the room, looking at and giving them feedback on their work. They check with him at each step to confirm that they are succeeding.

Planning. Since no curriculum is specified by the district for these special children in science and social studies, Martin selects topics and materials he thinks will be interesting or are important and uses these as the basis for the students' work. The materials included: worksheets prepared by Martin or from the text publisher, reading and subject matter texts, videos, and maps. Among the methods observed were the following: reading and answering questions, copying of notes from the board, video-viewing followed by teacher's oral quiz, and student-prepared oral and written reports.

There did not appear to be any particular reason for the sequence of lessons and the content presented seemed somewhat arbitrary. Preparation was evident in the choice of materials and in worksheets, but there did not appear to be any overall plan or governing idea behind the choices. The children were not told why they were doing the particular tasks, nor what they could expect next. Reference to previous lessons on the same or a related topic were either not made or were of the order of: "Remember the other day we looked at the video on.........today we shall see....."

Martin later pointed out that although the connections may not have been apparent or directly stated during the lessons observed, these connections would have been made at other times, and the purposes explained.

On planning, Martin commented that he sees no reason for elaborate lesson plans. When working in the social studies text, Martin appeared to have decided in advance to use the content and illustrations as the basis for teaching skills in making inferences, although not to have planned particular questions. He is, however, also responsive to what he sees happening and takes up things that emerge spontaneously. For example, he suddenly interrupted the class while they were doing reading questions to ask about the word 'blade' which was in someone's reading. The children suggested meanings and uses of the word and gave sentences. The purpose of such interruptions is not apparent and the examples are unconnected to anything else going on during the lesson.

Role of the Students. The students in the class are basically obedient and compliant. They follow directions without complaint, are friendly and relaxed. They perform the assigned tasks and willingly volunteer answers to questions in the frequent quiz-type sessions. They appear to like that format and the immediate reinforcement of right answers.

The students wait for instructions and follow them. They do not go beyond the instructions. Their questions are about routines and procedures rather than about the content or meaning of what they are to do. As learners they tend to be recipients rather than initiators, although they are busy and seem to be on task most of the time. They assist in some of the chores of the room like moving the video-recorder, and delivering things to other rooms, but there appear to be no routines set up for students to assume certain responsibilities regularly.

Students rarely suggested alternative topics or activities to pursue in class, nor did they appear to take responsibility for evaluation. They follow directions and assert their individuality less in academic ways than in personal relations with the teacher who establishes himself as caring by knowing about their out-of-school lives and by sharing information about himself, his feelings, preferences, and interests outside of school.

Interaction. The interaction in the classroom is primarily in the direction of teacher to student, and takes the focus of: directions to the whole class about procedures; what to do in a particular lesson; quizzing to check on what is remembered; comments about behaviour; and one-to-one monitoring. Students work on their own unless the task specifically requires a joint effort of a small group. Talk and sharing ideas about their work seem to be discouraged. The students - student interaction therefore is generally social in nature, not related to academic tasks.

Evaluation. Evaluation is ongoing and formative. It occurs constantly in the context of the students' individual work, both while tasks are being done, and immediately they have been completed. Feedback about performance is used as an instructional tool, instruction prior to an assignment consisting mainly of directions about procedures rather than taking the form of models, illustrations, and explanations.

Other methods of evaluation include oral quizzes to test recall of information following group reading or watching video films. Some questions in reading are answered in writing, and end of term tests were written. Reading levels were tested by standardized tests.

Martin emphasized the need for good grades and would comment on the 'grade' quality of pieces of work as they were handed to him. He urged the children to keep up their grades.

Organization of the Class. Lessons began with a 5-7 minute period of directions by Martin to the whole class on what they were to do. His directions were procedural rather than instructional and except in the case of the computer class where he reminded them of what they had done in the previous lesson, there was no reference to what had been done before. Martin did not include statements about the purpose of the lesson, nor its connection with the students' existing knowledge and experience in his opening remarks. He directed them to the texts or other materials required and the students proceeded readily to the assigned tasks.

Once directions had been given, the usual pattern was that Martin spent part of the time walking around offering comments, help and feedback, and part checking work at his desk. In some lessons, where all the students were doing the same thing, like watching the video or reading a section of text, the class concluded with a whole group oral quiz or individual reporting. Otherwise, the class did not as a whole stop work and begin a new lesson. Individuals, as they finished, got directions on what to do next, and gradually all were working in the same subject.

The class was organized around things for the students to do which Martin monitored and evaluated. Topics were not introduced and taught so much as assigned. Review, transition, and follow-up either did nor occur or seemed perfunctory and had a managerial rather than cognitive function, e.g. to assist students to get on task.

Illustrative Example and Analysis

Prior to taking the 406 course, Martin relied on videotapes and texts for the content of his science lessons and used the content as a means to teach such skills as notetaking, studying, and memorizing. Excerpts from two lessons illustrate the teaching patterns common in science.

In the first, Martin had selected a videotape of a PBS Documentary about the bald eagle and was showing it, he said, "to see what they can learn from the film." The children already had some notes on the topic. Martin had used an encyclopedia to obtain information he thought important, and written this in short simple sentences on the board for the children to copy and learn. The film provided supporting data. The notes required reading and writing which meant the work had a language arts component, and Martin said he also "looks for cues in the film to expand in other things". In this particular case, ideas about distance and thus estimating arose during the discussion.

During the film, Martin wandered in and out of the room, called restless students to attention, and stood watching from the back. He interrupted a couple of times when he drew attention to how to distinguish the male and female, and to ask about an eagle egg. A few children mumbled a response, but the comments were not taken up.

When the film was over, Martin began asking questions about it. He addressed particular questions to individual students by both naming and pointing to them.

"Karen, tell me something you learned. Not necessarily what they said, but what you saw."

"The nest."

"What about the nest?"

"Two ton."

"What was it made of?"

"Straw."

"Ronnie, how big was the nest?"

"About 4000 lb."

"No, I didn't want to know how much it weighed."

A similar question and answer sequence continued in which Martin checked on students' recall of the facts and their understanding of the meaning of these facts. Students raised their hands to answer and were discouraged from responding out of turn or uninvited. All the work was oral and the quiz moved quickly with several students raising their hands to answer each question.

Martin asked the children about scavengers: "Anyone know what it is?" The students guessed randomly. He reminded them of movies such as westerns in which scavengers appear. "It begins with a 'v'." One boy then guessed correctly.

One student volunteered an observation. "An eagle can see a fish jumping in the water from thirty miles away." In response, Martin had the children stand and estimate distance by looking out of the window and noting distant buildings. By doing this, he led them to conclude that the eagle could not see thirty miles, but probably three.

One student commented: "We'd need binoculars."

"Yes, good."

Martin then directed attention to their notes for the test on Thursday and gave directions on how to study it.

"Read over your notes quickly, then slowly, trying to remember. What points might I ask you from your notes?" Martin reviewed some of the facts about eagles and students responded readily with answers.

The children had responded very willingly in the quiz setting and seemed challenged by the demand on their memories. When the question about the distance an eagle can see was raised, they stood and looked out the window, following Martin's directions and named local buildings that were at various distances from the school, in order to get a sense of "miles away." The discussion was quite lengthy and Martin appeared to be taking advantage of the question to teach something the students ought to know and be able to do.

One might argue that if the class had been working on estimating in math, or about to start, or if other examples were then given to practise, this instance of estimating would have had obvious meaning for the children. As it was, it seemed to occur and be pursued so randomly that the response was merely ad hoc. The great weight of the nest might have warranted an equally thorough discussion, but it was not taken up. The closing comments at the end of the lesson did not suggest that any follow-up was intended.

Martin's assertion that he is using science content to teach language arts skills may perhaps be more accurately phrased as an awareness that in learning science one is also learning the language, both written and oral. There was no evidence, however, that those skills were being taught in a systematic way, although they were being used by the students. Martin explained that his main purpose in the social studies at this time was to improve some children's short-term memory and to teach them to take notes. When he saw an opportunity to teach a concept such as distance, which the children need, he would take advantage of it in the way we observed.

The second exerpt is from a subsequent science lesson. Martin had prepared the class in advance that morning by explaining that the children were to choose a text in groups, to decide on a topic they were interested in, and then write about it. Martin spent a few moments at that time with each group discussing the possibilities of the topics.

In the afternoon, when the free reading period was up, Martin, speaking from the back, said, "Okay, you can get into your groups now and do your science. Work on the topic you want to do." The children stood and moved their desks close together.

On the board Martin had written:

Science
- choose a text you can read
- choose a topic
- tell something about the topic

Remember, I want ten points," said Martin.

"Ten points," echoed one of the girls.

The class got the books they have chosen. Martin went around talking to them. "I've given you some ideas, but you have to find some more of your own, right?" he reminded one group. To a question about whether something had to be done, Martin responded "You're supposed to be improving each time you do this, you know. You did a very good job last time."

"Joanne is doing fantastic, I can't believe what she's doing." he commented to the observer. Joanne was working by herself on the topic of oceans. She was copying a section from the encyclopedia verbatim.

Two girls were reading about the human body. They copied sections about parts of the body. They said they were reading each part to see what it was about and then writing a sentence about it. Each of the sentences I saw had been taken almost verbatim from the text. Martin felt that this exercise was valuable for these students since they had never before taken notes. "When they do this they are copying but that means reading, writing and later interpreting when they are tested on it."

When the class had been working for about half an hour, Martin called the students to report on what they had read and noted. The class stopped working individually and sat ready to share. Martin asked one of the children to go to the front of the room and tell about his topic. Most of the children who did this read aloud from their papers and Martin asked them questions either during or after the reading. His questions asked for clarification of points they had stated inaccurately or out of context. If the student-presenter was unable to answer, he directed the question to the whole class. He himself added information about their topics also and did some explaining. The interaction was of a question-answer type, with Martin leading and giving direction. The children in the class did not make unsolicited comments, nor remark on the content or quality of the report. Each child was given a clap after reporting, and Martin expressed his satisfaction with the quantity and choice of material.

Joanne was the third presenter to go up to the front.

Martin: "What's your topic, Joanne?"

"The world's oceans," she giggled. Joanne seemed to feel embarrassed and nervous but she began talking about her topic. She tried to tell things but Martin suggested she read her paper aloud as she was rather hesitant. She began reading in a soft voice, very haltingly. She had difficulty pronouncing the words. Martin suggested she tell about what she had read from memory and she agreed to do that.

She mentioned that the ocean is salty; that there are many living things such as sharks in the ocean. She talked about sharks in California.

Martin asked about the type of sharks, but she didn't remember their names.

Martin: Why is the Red Sea so salty, do you remember?"

Joanne: "No... The dirty water goes into rivers and...."

Martin: "Okay, okay Joanne, that was fine. You've got a lot written down but you had trouble getting it out."

Another student went up.

Martin: What is your topic?

Student: Bright light, dim light.

Martin: I didn't think that was your topic."

He got up and checked the book, laughed and said, "Okay, you've got the wrong title, but you've got lots of points, so go ahead."

The student stood at the front reading her statements. It never became clear to the observer what the connection was between the topic of skeletons and what the student said about light. The statements were separate ones about the skeleton, but did not seem to be written in her own words. Martin commented on the statements and said he was most pleased with the skeleton report. He called for that group's papers and read what they had written to the class. "Your frame is a system of bones called the skeletal system", etc. and commented on some of them, adding information and detail. He pointed to the parts of his own body that were noted in the statements.

"'Muscles keep bones in place.' We'd look pretty lonely without our muscles, wouldn't we..... 'Some people have fast twitch and slow twitch muscles.'"

Martin explained a muscle biopsy which is a method of determining whether one has fast or slow twitch muscles.

"A muscle is usually attached to a bone by tendons." Martin pointed to the tendons in his wrist. The children bent and felt the tendons in their wrists as he did so. Martin recounted the time when he cut his own foot with a chain saw and the tendon flicked up since it is like a rubber band.

"Okay, you've done well. Now you can go into art. You can do head art or I've got the computer art here.", said Martin.

"Can we do weaving?" asked two boys.

"Yes, sure".

In this session, the students made their own notes on their reading. Martin felt that was more demanding than his previous practice of giving them the notes to copy from the board. The children were also using the texts and choosing their own topics. Although the task had been made more complex, no additional instruction was given in how to do it during the lesson. They substituted copying from the board with copying from the text, exercising choice in the statements they copied, but otherwise reducing the task to the level at which they could cope with it. There was no purpose stated for the task, nor guidance in how to go about it during the lesson. The children's choice of content seemed to be simply a matter of what appealed as they looked through the books. The whole sequence, including the reporting was performed in a mechanical manner, the children doing what they were told and receiving no critical feedback that might assist them in being more effective. Supplying the ten points appeared to be the goal. The reporting was not a communicative task in the sense that the listeners bore any explicitly asked for responsibility for understanding and learning through listening. Martin explained that the challenge for his class was to gain confidence enough to stand up in front of the group to speak, a task they had previously found difficult.

The greatest interest was shown when Martin talked about the muscle biopsy and every child felt his arm and identified his muscles. As part of a lesson on the body, this explanation was valuable. It could have led to further work and fitted into an overall plan. As it was, it occurred spontaneously and seemed to provide the students only with an isolated item of information.

The interest Martin had previously expressed in skill development was exemplified in the assumptions underlying these two lessons. The students performed activities which could be described as: notemaking, reading, writing, thinking, reporting, summarizing, and listening. Since no teaching in how to do any of these activities occurred, either in the form of prior instruction or critical feedback, it appears that Martin assumes that assigning the task and providing opportunities for practice will produce skill development. The lesson itself was self-contained; all aspects of the task were completed in the class period. The content itself was merely a vehicle for the practice of the skills; thus the quality and quantity and level of understanding of it were of little significance. Nor, presumably did it need to be organized or sequenced since it was an arbitrary matter what content was used.

Changes in Patterns

Martin decided that he would implement a discovery approach to science for his project in the problem-focused course. He understood such an approach to mean that precise objectives need not be set for the planned activities, and that outcomes need not meet particular criteria to indicate success in the work. As the teacher, he could provide materials and suggest a general learning objective. It was up to the students to work with the materials, to make observations, to draw conclusions, and to ask for help as they needed it. Such help would take the form of clarifying questions rather than answers, and offer direction that would enable and facilitate the students' renewed efforts, rather than encourage dependence on the teacher.

In the lessons which we observed, the class was working with batteries and the making of circuits to produce an electric current. The students worked in groups having a common task which required some discussion, problem solving, and speculation. They spent a lot of time talking with each other about the subject, and when they reported to the teacher or were involved in a whole class review, they appeared to listen to each other and to contribute and question each others' observations. A series of lessons was devoted to the same task with variations that would allow increasing demands to be placed on the students' ingenuity and understanding. Most of the pressure for variations came from the students who wanted to try out the experiments described in their text. Martin began each lesson with a review of what they had done previously and helped them to verbalize the processes they had set in motion with the connecting wires and batteries. During this introduction, new possibilities and combinations were suggested which the students took as the task for the day unless they had something else they wanted to do, which was usually the case for at least one or two groups.

These lessons thus proceeded differently in several ways in comparison with the previous science lessons. The pattern of organization of the class and the nature of interactions were affected by the different appproach, as was the role of content in the lesson. The following excerpts are representative of what was happening.

The lesson began with a review of what the class had done previously with the batteries.

T. Last science class what did we do?

St. Umm...we did.

St. The batteries.

T. We did the batteries, all right!

Children laughing.

T. What did we do with them? Just a brief description.

St. We connected them with the light bulbs.

T. Did you discover anything?

St. Yes, when you press the switch down one light goes on and when you press it down, one light goes off.

....

T. Darcy?

St. Did we make electricity?

T. Did we make electricity, did we really make electricity?

St. The lights lit up so we had to.

T. That's an interesting point I wonder if we made electricity there. How many people think that when the bulb lights up we have made electricity?

T. If I put a wire here and a wire here and a bulb here, what's going to happen to the bulb, Trevor?

St. It's going to light up.

T. It's going to light up right. Am I making electricity when I do that?

St. No...

St. Yeah...

T. Where's the electricity?

St. In the wall.

T. Right here. O.K. good, that was an interesting answer, it is passing through the wires and into the light. Umm..let's draw that on the board. Of course I'll never find the chalk though.

St. I think it's under the papers.

T. No.

St. You never find your chalk.

T. Have to keep it more tidy... We'll say this is the bulb here, so when we hook up this way the bulb lights up is that correct?

St. Yeah.

T. Any ideas on how this works. Why, why does the bulb light up? John.

St. Because it's going through the wires.

T. What's going through the wires?

St. Electricity is going through the wires which goes to the light bulb.

T. Why does the bulb light up though? Jeff.

St. Because the electricity goes through the bulb.

T. So?

St. So it lights up.

T. But why?

St. Because you need light to see.

T. O.K. but what I'm sort of trying to figure out here is, I mean here I've got this wonderful little bulb, and what I want to know is why it actually lights.

St. Because of the wires.

St. Because of the wires in the centre.

T. Alright, let's take a look at these. Let's look at this, see this? This wire here.

St. It's thin.

T. It's thin, that's interesting, you can barely see it, and you're telling me that when you let electricity run through the wire, what happens?

St. It lights up.....

T. Now I understand that you told me that the electricity passes through. But why does it turn white?

St. Umm, because it's ...

T. O.K. the electricity warms it up.

St. It goes fast through the wires.

T. It goes fast through the wires. O.K. all this makes this little tiny wire work out.

St. White hot.

T. White hot, O.K. And because it goes white hot it gives off light and heat, because you know when you touch a bulb it's hot, that's good that Neil actually said that because it gives off heat, therefore we know that the wire gets hot.

St. And so does the glass on the bulb.

T. So does the glass on the bulb. Um... and therefore gives off light. What happens if the wire burns out?

St. It doesn't work.

St. The wire falls off...

T. Means the light doesn't go, why?

St. Because the wire.

St. No electricity goes through.

During this exchange, Martin drew a diagram on the board to show the flow of electricity. The students provided comments about the diagram and about the way the electricity flows, how light is created, and why the light goes off. Most of them participated and all seemed to be listening. Although the students' answers were short and for the most part unelaborated, they were not trying only to get right answers but in the process were expressing what they had learned from experience. The whole-group work was serving to verbalize their hesitant grasp of the principles behind the activities. Martin did not rush to achieve closure. Although he led the discussion, he listened to the students' responses and urged them to look at the diagram and keep thinking to arrive at a correct interpretation, rather than simply offering it. In this way the children were using more of their own words to reach understanding even though the discussion did not flow easily and Martin struggled to draw out their comments.

After the review, Martin gave directions for the day's work:

T. Today what I thought we could do, or thought you could do, is try and make a switch. Give me an example of a switch.

St. A light switch.

T. A light switch. What happens?

St. It turns the power on.

St. When it traps the light, I learned this from my sister, she told me this. When you turn it off there's these little things that cut the electricity that goes through to the light.

T. So it sort of stops the electricity.

St. Yeah.

T. So if we have this going through on, the bulb would be light, right. And if we put a switch in here, if the switch is on, what happens to the electricity?

St. It goes through and turns on the light.

T. And if we turn the switch off.

St. There's no electricity going through.

T. Now you can experiment with this stuff and that's fine, and come up with something and remember you are trying to make a switch and maybe you can hook up the batteries in a different way. Then you have to write them up you have to write them up a little better everytime. Ronnie and Gus you only got a C on the last write up.

The children then separated into groups and began working with the wires, batteries, and bulbs. A few took pieces of sandpaper and cleaned off the terminals as Martin had demonstrated. The girls were unable to make their circuit of three joined batteries and bulbs light up. Martin went to join them and see what was happening. He pointed out that their wire connections were faulty and the children corrected these but the lights still would not go on. He then suggested they check out the batteries. Realizing he was taking over the thinking, he left, laughing that he was having a hard time keeping out.

In the small group, the girls and two boys all contributed information and ideas about what was happening and about what the problem was when it didn't work. They tended to flow in and out of concentration on the topic and task, chatting about things they were wearing, the school next year, and so on, but were not diverted into an extended discussion. The task held them for most of the time, and the personal exchanges indicated what Martin referred to as improved "social integration" of students who had previously had difficulties with interpersonal relations. The lesson typified Martin's teaching after the problem-focused course.

The student interaction during these science lessons was quite different from what we observed earlier. The children are now listening to each other, focusing on the content of the lesson together, and supporting or arguing with each others' ideas. The 'write-ups', which were intended to be a product of joint interaction, were only nominally so. Some members of the group simply ignored the task and did something else on their own, but all the students participated in the investigative manipulation of the batteries to some degree.

Martin viewed displaying the writing-up as a means of providing the others "with a schema they can add to" since they could read what the others had done. He did not assist with the content, but gave help on spelling. The written descriptions of the experiment, for which a minimum of guidance was offered, appeared to be the main means of formal evaluation

We may say, therefore, that this method of giving instruction to the students has not changed. In the lesson described above, the students were told what they were to try to do: to experiment with making switches. In a previous lesson, to -

> do nothing more than hook up batteries in different ways, experiment, see how many bulbs you might want to hook up, see what you can discover... maybe you can get the bulb brighter or something. You can use those red stem books to get ideas.

The students responded well, as before, to the directions and complied willingly. Martin simply provided the materials and had no stated objectives. Adopting an inquiry-approach to learning might seem to justify Martin's method. His style seems to fit with his perception of the approach and the students reported in interviews and through a survey done by Martin that they enjoyed the work in science.

Although the amount and form of instruction did not change, what differed was the amount of student involvement in the activity and the length of time given to the single topic. With the extra time, the absence of any pressure to get particular things across, or to complete the study after a set time, the students were able to talk and think through the material and ideas and choose to pursue what interested them. Martin's reviews and summarizing at the end of lessons gave the class time a shape and focus it had lacked before. Whether or not he intended it, the students may interpret the assigning of several class periods to the work as an indication that Martin places a value on their reaching an understanding of what they were doing.

Martin himself saw the differences as:

1. More student involvement
2. Increased learning
3. Less teacher talk to give directions and tell them what to do

In the view of the observer, the first would be true if qualified with the words 'with each other' since it seems the difference in the students' behaviour was in their relations with each other in the working groups. 'Increased learning' may have resulted but there was no actual evidence of that; and in the case of 'teacher talk' any reduction was probably minimal, although Martin perceived a significant drop. The nature and purpose of that talk, however, now seemed more content directed and to be facilitative rather than evaluative. Furthermore, all the class discussion focused on the topic and there was no wandering off into tangential mini-lessons. Although there was a good deal of off-topic chat in the groups. and between Martin and individual students, this talk was clearly distinguishable from the object of the lesson.

Martin expressed some discomfort with the 'discovery approach'. He thought it easier to

> write the notes on the board and have them learn it... the results are predetermined, but there's no learning. I don't know what's going to happen this way. They tell you not to set out with certain ideas of what the children will learn. You don't know. This experiential learning takes a lot more out of me.

In spite of the discomfort which he voiced and which was apparent in such contradictions as: 'the results are predetermined (i.e. they will learn certain things) but there's no learning' (i.e. they won't learn those things), Martin persisted with this project. He valued the pressure of having a contract to do the project which gave him direction, and the advice of the mentor who, he said, "worked really well and gave me advice I never would have thought of."

Although we did observe changes in Martin's classroom, we were not certain if they were part of a basic change in his teaching patterns or a result of selection of a particular unit. The use of an activity approach in science produced changes in the spring of 1985. However, in a subsequent interview held in January, 1986, Martin reported that he had not yet used the activity approach with his students to that point. He felt that they were not ready.

CASE STUDY: Tara Dobol

Teacher's Professional Background

Tara Dobol was a first year teacher during the year of the project, but she has been associated with the same alternate high school as a staff assistant (a paraprofessional who assists teachers and helps individual students) previous to her employment as an art and remedial English teacher. Her background includes courses in art at the community college level and the Professional Development Program year at Simon Fraser University which serves as initial preparation for teachers. Now she is enrolled in a Bachelor of General Studies program but plans to transfer to complete a Fine Arts degree. She has also taken a course in learning disabilities and done projects in language arts courses that related to the education of special children. These experiences help her in her teaching and counseling roles in this specialized setting.

Tara has a strong interest and background in art, and she had reflected about its functions for high school students. She says she often can "see" the students through their art. For example she described one girl who was very much a loner in the class and began to draw pictures of a girl, continually, all at the bottom corner of the page. The drawings became more and more "scrunched up" and darker and darker. When Tara asked her about them, she began to talk about her problem through her work. Later when she felt better, her drawings grew larger and filled the whole page. Tara views art as important for these particular students to use to express themselves, but she also recognizes that art has additional functions for those students who have considerable artistic talent.

In English she has a less strong background, but her knowledge about those who have learning disabilities allows her to help remedial English students individually.

Context for Teacher's Participation in the Project

Although Tara has not been involved in a research project previously, she agreed to participate in it after she had registered for the problem-focused course, a course she felt would help her solve unique problems she faced in her alternate school art classes. She had heard about the course while she was enrolled in a learning disabilities course in the fall term.

Although she had agreed to allow the research team to observe her classes, during the first few visits she had some reservations about the research team's understanding her unique context. She expressed concern that we might misinterpret the students or judge them negatively. She also said that some of their behaviour was more extreme than usual when visitors were in the class. Later in the term after she had seen the written descriptions of observations of her class, she became more at ease with the research team and said the students were acting in a more "normal" way during research team visits.

School Context

As part of the public school system in a large city, the alternate high school is one of more than two dozen small secondary schools that cater to special groups of students. This particular school provides classes for 80 students, most of whom have had difficulties with the regimentation and large size of regular high schools or have had problems outside school. One third of the students live in single parent families, one third live on their own, and one third live in group homes. Half of them have social workers, who work with them. The students are divided into "Groups" which serve several functions: social studies and consumer education are taught through the groups; the groups function as homerooms; they also provide a setting for counselling and recreational activity.

School rules are few but strictly enforced, and the students know what is allowed and what is not. They have made the choice to go to this school to earn their high school leaving certificates, and they know that they can easily lose the privilege of attending a school specially tailored to suit their needs. Thus they rarely overstep the bounds. School spirit is evidenced in the students' active participation in informal softball games and camping trips and in the 1984 graduation ceremonies which drew an audience three times the school population.

There are five teachers, two staff assistants, two child care workers from the Ministry of Health and Welfare, and a half-time secretary at the alternate school. The principal is not located at the school because he is also principal of a large regular high school. He rarely visits, but one of the vice-principals is supportive and more apt to be involved with the alternate high school, although he also does not visit often. Thus the school runs with minimal administrative support.

The context in which Tara works differs from that of traditional high school teachers in several important ways. Tara is physically separated from the rest of the school by having her base of operations in the "art hut," a wooden, one-storey building across a driveway from the other buildings, all of which are on school-board property behind the old model school, a landmark building recently damaged by fire. The alternate school is not in close proximity to any other schools. It will be moving to less run-down premises in a redundant elementary school annex in the fall of 1985.

Because Tara is the only art teacher in the school and the only teacher in her building and because students take up her lunch or coffee break times with questions or just chat, she does not have regular informal contact with other teachers. However, she maintains close connections with the four other teachers because they all have dual roles as instructors and counselors of the individual students. She works as part of a team for the "Group" sessions with a teacher of theatre and sports, and she team-teaches remedial English with another teacher. She also has support from art teachers in other alternate schools (they put on an art exhibition from all the alternate schools annually), from the school board art coordinator, and from professional development days with other teachers in the district.

Class Context

The art classes Tara teaches are small, ranging from 10-18 students. They focus on various media, for example, pottery, painting, and drawing.

The students come with a wide variety of art backgrounds. Besides the differences in their natural talents, they come from different areas of the city, different lower schools, and different levels of prior instruction and practice. They also have different preferences for art media and different tastes in design.

Several students have impressive artistic talent. They have won prizes in art exhibitions and intend to further their art training. Less talented students take art and use it as a means of expression. Approximately 50% of the students in the alternate high school take art, a percentage Tara assumes is higher than in most secondary schools.

The atmosphere in the classroom is relaxed. Students wear bizarre clothing and move about the room freely except during direct instruction. They are allowed to smoke and have coffee during breaks but not during class sessions. There is often friendly bantering among the students and between them and the teacher.

The teacher monitors attendance and tardiness carefully but unobtrusively. She does not tolerate rudeness, but creates no issue over profanity.

Patterns Observed in Baseline Data

Role of the Teacher. Tara sees her role as critic, facilitator, expert, and editor as well as instructor and counselor of the students. In her critic role she praises good art work and writing and makes suggestions for improvement. In her facilitating role she introduces and demonstrates new techniques, explains how to do things, and makes suggestions for options students have. She assists them with their projects in art and with their written work in English.

As an expert, she is able to model appropriate techniques, for example, for handling tools like air brushes or for applying glazes to pottery. She is an instructor in her setting of assignments, organizing classes, providing knowledge, and evaluating students' work for marks.

She is a counselor in her interactions with students and in her concern that they learn responsibility, self-control, how to be considerate of others, and how to persevere in completing tasks. She is very concerned about her students' learning and also wants them to be polite to one another. She is unperturbed by their interruptions even when they are irrelevant: "If you buy into it, the kids will ride you. If you ignore it, it will stop." However, even though she rarely shows disappointment with their behaviour, she can be very upset about cruel, personal remarks made by one student to another. She is available to students to talk to before, during, and after class, and at lunch and breaks. She assists them with their projects in art and their written work in English.

She guides English and "Group" discussions to help students relate the subject matter to their own lives. One "Group" session involved the showing of a film on squatters. Although the film took the whole period after some preliminary definition and discussion, Tara planned to have a follow-up discussion to help students understand some historical and contemporary connections between alternative life styles and government bureaucracy.

Planning. For the art classes Tara has the materials prepared, and she has planned what she wants to accomplish during the term. She also plans her short lectures that introduce units or new techniques in art.

For remedial English, the team outlines the topics to be covered during the term so that grammar, reading, structure (sentence and paragraph) and essay writing alternate with short stories. Each teacher in the team plans questions for the literary discussions or the prewriting stimuli for specific English classes.

In both subjects Tara plans time to tutor individuals who need extra help and to monitor all members of the class through discussing their work with them.

Role of the Students. The students do not appear to follow traditional expectations about behaviour in secondary schools. They are not compliant or docile, and they act more as participants than as recipients of instruction. They work more for themselves than to please the teacher. They appear to accept the teacher as leader because she knows more and not because she has power over them. Her credibility rests on her ability rather than her authority.

Students talk to each other except when instructions are being given, and they move about the room or leave and enter without asking permission.

However, their attendance and tardiness are monitored carefully. Most absences result from appointments with counselors elsewhere in the school.

Their talk is sometimes related to the lesson and sometimes not. They often banter with each other or with the teacher. They also share food, organize "donut days," and praise their colleagues' art work when they like it. They sometimes listen to music on tape while they are working on their art projects, and students take turns bringing tapes to class.

Most of them show responsibility about getting out their own materials, running errands, organizing the video project, and cleaning up the art hut. They are more interested in art than in English. Some are not actually always involved in learning; rather they seem to be engaged in personal exploration instead. However, they are accepting of the teacher, the class, and the school.

Interactions. There are teacher/class direct teaching interactions at the beginnings of units in art or at the beginnings of class when new techniques are explained and demonstrated, assignments made, or reminders given. The majority of interactions within the class are more informal: teacher/table group, teacher/individual, and student/student. The teacher monitors the students' progress, offers help and praise, demonstrates new techniques, makes suggestions about design, or just encourages them as she moves around the room.

While working, students in one class were observed to be involved in eight or nine interchanges, none of which involved the teacher who was preparing the paper for their paintings. While this behaviour is not unusual in art class, it is more unusual that there was no consistent need to talk to the teacher. Sometimes the students' comments were positive and helpful with reference to the art projects; occasionally they were negative about other students' appearance; and, at times neutral interchanges about what was going on took place.

Evaluation. Clear standards about credits are set by the teacher. Students know exactly what they have to do to get their credits. The teacher keeps a binder in which she has a section for each student including comments about each project the student does. The students are permitted to see all the comments written about their work, and the teacher has interviews with students regularly so that they will know how they are doing in the course. She also uses frequent verbal encouragement and reinforcement through remarks as she monitors the class' work: "Yes, that's a lot better. You've got some good, strong lines." She posts students' work on the walls of the classroom for comment and inspiration.

Organization of the Classes

Both the English and art classes are organized in a similar way, with instructions or assignments given at the beginning of the period with the rest of the period taken up with students' working on their own or occasionally on group projects. The instructions are brief, usually about five minutes in the art classes, and there are sometimes no instructions because the students are progressing on their individual projects. In both subjects Tara helps groups and individuals with their work. The students clean up at the end of the classes, including washing the art tables if they have been dirtied.

Illustrative Example and Analysis

The following example illustrates the way Tara gives instructions, her monitoring of the class, how the majority of the students respond, and how one individual reacted in this particular class.

In one art class early in the term, Tara gave instructions in using viewfinders ("L" shaped pieces of heavy paper that can be positioned to "frame" two-dimensional and three-dimensional objects) to find areas of pictures or real objects which have interesting composition. She demonstrated using the frame on magazine pictures, students' artwork, and reproductions of paintings and drawings. She wanted the students to see how they could isolate certain sections of drapery or human bodies.

After the instruction the students were asked to do a line drawing of a hand, a boot, or part of the body of someone else, like a shoulder. They could use the paper frames or imagine frames to isolate the sections they wanted to draw. Tara gave oral instructions:

1) choose your subject
2) draw the major parts
3) draw the major lines
4) don't worry about texture and shading right now,

and reinforced them with chalkboard instructions:

1) find the area you wish to draw
2) lightly sketch the area
3) correct line; add major details
4) begin to add shade and texture.

Most students proceeded to do as requested. Students talked to each other and cooperated in suggesting composition subjects.

However, one boy (George), who was sitting alone, read a newspaper for ten minutes, then drew a hand with an obscene gesture. When Tara told him it "wouldn't do," he drew his left hand with a pointing gesture. When this hand drawing was praised, he went back to reading his newspaper until admonished to work in his sketchbook until the end of the period. George then used the newspaper for an idea and made a drawing of a character in the "B. C." cartoon.

Most of the students understood the instructions, were interested in their drawings, and produced quite good products. George was cooperative when noticed, but he appeared not to be motivated to proceed with his drawing unless directed by the teacher.

Changes Observed in Patterns

In the second set of observations, we didn't see any differences in the appearance of the classes after the problem-focused course was completed. There seemed to be no changes in the patterns. The role of the teacher, planning, interactions, and organization of the classes appeared the same. The students still listened to instructions, worked on their own projects, consulted the teacher, and discussed the work with their peers.

Therefore, near the end of the observation period we queried the teacher about what the project had been. She described both the project and the relevant background. When she began her project, she had a clear idea of the problem she wanted to solve in her art classes. She already had good relationships with students, and they appeared to respond well to her teaching. What concerned her, however, was the students' wide range of talent and background. She recognized the difficulty of attempting to teach even small classes all together. Therefore, she organized her project to develop an individualized drawing unit.

Seven students volunteered to help develop the unit. Tara asked them to make suggestions about exercises which they felt had helped them learn specific drawing techniques, for example, perspective; these recommended techiques were then incorporated in the drawing unit. This unit is contained in a notebook which the students can look at whenever they wish. The way it works is that Tara gives full class instruction, briefly, in all the techniques suggested in the unit notebook and sets out the requirements of the unit: so many drawings, for example, of so many different types. Then the students can use the unit notebook to help them try the various techniques to complete the types of drawings required for them to get their drawing credits and to explore those techniques which particularly interest them. It is all right, for example, for a student to do several variations on one technique, if it intrigues him or her. Individual help is available, as it was before, but the students have more freedom in what they do and when. The unit notebook also allows less experienced students to practise more elementary techniques while more advanced students try more difficult media and techniques.

Having discovered that Tara's project involved individualizing instruction, we went back over our observation notes to focus on the role of the student and evaluation. It was fortunate that we had observations of group responses as well as of individual's responses. What was different in the students' roles was that they had greater choice in what they did and when they did it. The requirements of the drawing unit were made clear both through direct instruction and through the unit notebook which specified the requirements, explained techniques, and showed examples. The options allowed students to concentrate on the types of drawings they found most valuable. The students' apparent enthusiasm, their application to the task, and the teacher's affirmation of their endeavors led them to persevere on their own far longer than they would otherwise have done. One student happily cut out hundreds of tiny "x's" to make the type of stencil he wanted. According to the teacher, earlier he would probably not have had the patience to persevere with the tedious work, but now he "invests in" and "owns" his project.

George, the "newspaper boy" who in an earlier class preferred to read his newspaper rather than draw, now derived his inspiration from characters in newspaper comics and spent the whole period working alone drawing Andy Capp and then cutting out the stencil. He did not need to be reminded to get to work. Our speculation is that his motivation to do sustained work in class may have to do with his understanding of the long range goals of the drawing unit, what work is expected of him, and the cumulative effects of the daily art sessions.

Evaluation has also changed in that students act more responsible for what they are marked on. The method of evaluation is the same, but the standards have changed. Instead of setting one standard for the whole class and comparing students' work implicitly if not explicitly, Tara now grades students in terms of what they have contracted to do.

Discussion

Before the project began, Tara's classes were straightforward with instruction in techniques, practice, and then individual work on projects.

When Tara first introduced her unit notebook idea to the students, they responded with confusion and inaction. She was very upset to discover that after she had taught all the techniques and spent one class period introducing and explaining the unit notebook, students took several days just looking at pictures in magazines (one type of resource she has available for idea-generation) without getting started on anything. However, after those days during which she felt very discouraged and might, she later said, have given up the project if she had not had the help of the mentor built into the problem-focused course, the students just "took off" and began to work on individual drawing projects with self-direction.

She says she's very pleased with what finally happened and plans to develop similar individualized units for other media, starting with drawing. However, she also has some ideas for minimizing the initial confusion and "stasis." She recognizes that she gave them a lot to think about all at once and that they needed to have time for the ideas to incubate. Although at first she feared that she had jeopardized the success she had been having with the art classes, she later said she realized that the students were working harder and more productively because they had chosen what they wanted to do. They told her they enjoyed the fact that they had choice and that they had had input in developing the unit. She noticed that they appeared freer to adapt ideas from other media and use their imaginations than they had been previous to the introduction of the unit notebook. One girl used visual language in a book on inspiration for her drawing. While using the individualized unit, Tara sacrificed neither her rapport with the students nor her control of the order of the class, and the students were satisfied with what they had accomplished. As usual, students' work was posted on the walls: better and poorer examples, elementary and advanced techniques.

The shift in her teaching methods is consistent with how Tara perceives herself. She is able to give responsibility to the students for what they choose to do in art. Thus she has been able to reinforce her thrust to help students become responsible learners and mature adults, and she has been able to accommodate the various levels of talent, interest and background in her class.

Tara's Comment

I really think the experience was good, and I'm going to try to develop the painting unit this year with one of my classes. Another of my classes is quite unusual: some of them have had me for every art class I've taught in the school and some others haven't ever even handled a pencil. In addition there are some students with behavior problems -- all in the same class.

When I saw what I had there, I just chucked my original plans, and, after discussion, I made up a ditto of all the things they were interested in in art. It turned out that all of them were interested in drawing, and most were interested in some kind of sculpture.

Then I divided the class into two groups. I asked all the students who felt they were advanced drawers to go into one group and those who felt they wanted to start with the basics to go into another group. "If you've had the basics, then you decide where you want to go." The class divided into two groups immediately, and I made only one recommendation that a student change from one group to the other. One boy in the basics group was really strong in his drawing, so I asked him if he'd like to move to the advanced group, and he did.

The basics group is working with the drawing unit booklet, and it's working out well, even for the students with behavior problems.

I'm able to individualize the program for the advanced drawers. They said they wanted to work on foreshortening, so I did a lesson on that. They keep coming up with new ideas about things they'd like to work on. They give me as many suggestions as I give them. It's working out really well.

CASE STUDY: Deborah Marshall

Professional Background

Deborah has been teaching for fifteen years in grades K to seven. She was trained in England where she took a three year teacher training program. The program is focused on open education which has had an effect upon her teaching and helped her in doing the project she undertook as part of Education 406. Her first teaching experience occurred in Great Britain. After emigrating to Canada she taught in the Canadian prairies and Northern British Columbia before coming to the Lower Mainland. She has also been an exchange teacher to the Milton Keynes school in Britain. In the fall of 1985 she assumed the position of head teacher in another school.

Deborah takes leadership in her profession whenever she can. She was responsible for physical education in a school in northern British Columbia and has had responsibility for an open area project as well as a math project for grades 2, 3 and 4.

This year (1985) she will complete her baccalaureate degree from the Faculty of Interdisciplinary Studies at Simon Fraser University. She has found the university courses stimulating and helpful in improving her teaching. She also takes workshops whenever possible to help her in creating new materials.

Deborah joined the problem-focused course rather than another course because she saw it as a means of implementing a thinking skills package developed by an SFU professor which had been drawn to her attention by a student teacher. She saw it as a means of teaching important life skills and to shift her classroom role from instructor to facilitator because the aim of the package (The Primary Thinker's Box) was to encourage students to work independently. The philosophy of the program was not necessarily new to her. She had been very impressed with the social interaction and the self awareness gains that had been made by many of the children in her class when the student teacher had used the materials. That initial contact had convinced her that the materials had great potential and that they suited her personality and style of teaching very well. Despite 15 years of teaching, she found the prospect of this new project in her classroom very exciting because it provided an opportunity to learn. As she indicated in evaluation of Education 406, "To participate in a professional in-service practicum is to open a window and let in the prevailing winds. Sometimes it will calm you, refresh you, or even force you to battle the storm."

She saw her participation in the research project as another source of feedback. However, she did not wish to be used as an object of study but rather as a participant.

School Context

The small K-5 elementary school in which Deborah currently teaches has 200 students and is located in a mixed socio-economic area which is part of a large metropolitan district. Its location near a university provides easy access for professional development offered there.

Deborah feels supported as a learner within the context of the school. The principal values the role of the University in teacher professional development; he considered, for example, that her participation in the research project would establish a closer relationship between the University and the school. This could potentially lead to assistance from the university. The small staff sit around a table for lunch and often come together for pot-luck dinners. She feels that she has good relations with her peers.

Classroom Context

Deborah teaches in a third grade class having 24 children of whom two are learning disabled and one epileptic. She reported that at the beginning of the year some of the children were quite disorderly and had to be watched carefully. They had improved considerably since then. Sne also had found the class to be very dependent at the beginning of the year, but that too had changed so that they were now more self-directed.

We saw the classroom as a child's room rather than a teacher's room. The work displays which changed frequently were those of children. While they normally sat in two parallel blocks of double rows facing each other, the children were able to assemble at the back of the room for group lessons, games, and individual audiovisual work. The room was well supplied with materials and equipment; several tape recorders were in evidence, and a television set was located in one corner of the room. A guinea pig, who occupied a prominent location, received care and attention from students as well as the teacher. One gained the impression that the classroom was being used by the children.

Patterns Observed in the Baseline Data

Role of the Teacher. Deborah describes herself as a facilitator, organizer, and manager whose aim is to encourage self-directed, independent learners. She sees herself as a learner with the children.

In our observation of her during the baseline period, we found her role to be mainly that of an instructor maintaining control of the learning through providing clear directions and demanding clearly articulated standards of behavior. Her desire however was to be more of a facilitator. What we noticed during this period of observation, was that when Deborah worked with the class as a group, she consciously controlled the direction of the discussion. Students rarely responded to comments made by their peers. The exchanges were almost entirely T-St-T-St. She often repeated what a student had said, then asked a question from that. While the students were required to listen carefully to her, it was not necessary for them to pay much attention to what others had to say.

At a more general level, Deborah saw her role as a curriculum developer and innovator. She described herself as using new ideas gained from workshops and courses to create improved learning materials and methods for children. She also saw herself as being responsible for the socialization of the children, for their counseling, and their general well being.

She viewed independence of thought and the ability to use general thinking skills as primary aims of teaching which she saw as developing life skills for students. This conviction was central to her view of the subjects she taught. It directed the project she undertook as part of Educ. 406 as well as many of the teaching activities in use in her classroom.

Planning. Deborah indicates that she prefers not to use last year's plans, but rather to start fresh each year. In her planning she identifies broad general goals, selects materials and activities, but leaves the details to develop during the lesson. It was not always evident to the observers, however, that the principles which linked the activities and procedures to the general goals had been thought through as part of the planning. Deborah confirmed that follow-up activities were not truly related to the focus of the lesson. She had not recognized this herself and felt that getting the observer's feedback enabled her to focus "in the right direction more quickly."

Role of the Student. The students were given opportunities to be responsible in the classroom. They were observed to test themselves on spelling words, take responsibility for classroom routines without being reminded, and initiate activity without being told to. They tended to play a supportive role with each other when working in groups and pairs; concern was shown for each other as was the case when one student had had a seizure.

Interactions. Teacher-student-teacher-student interactions dominated the classroom interaction during the first observation period. Little interplay among students occurred particularly during whole class instruction. Also, on occasions the teacher repeated the answers of students, apparently for purposes of confirmation. Deborah also questioned students about their answers in order to help them develop their ansers. When students were asked to initiate questions and comments they did so. For example, in one case when presented with a picture of a frog looking at a dying plant, they volunteered reasons why the frog might be looking at the plant, and also, made hypotheses about why the plant was dying.

The social interactions that did occur among students were polite, reflecting, perhaps, the fact that the teacher frequently spoke to the students about the importance of respecting each other's opinions. They apparently preferred to interact in the small cliques to which they were accustomed. When dealing with content, they were also observed responding aloud to the voice on tape. In another example, pairs of students interacted with each other in order to think about comparing. They then wrote down what they had discussed and their comments were later laminated and placed in a notebook. Deborah described herself as "the eternal talker" and was aware that in the struggle to acquire new techniques she had a "survival need for holding onto the control."

Evaluation. Deborah's ongoing evaluation is evidenced by her response to student answers to questions and her comments on their written work. Records are kept of what the children say. From those, she notes that the students do much better than at the beginning of the year in terms of initiating and taking responsibilities. Self-evaluation is encouraged through coments such as the following "How do you feel about that?" or "What else do you need to do?" Typically, as a diagnostic check, she conducts reviews at the beginning of the lesson. Her feedback is usually specific and task-based and the students are commonly praised.

Deborah encourages students to talk to each other, to comment on each others' work, and to share ideas. Children's work is held up as a standard for others to model.

Organization of the Class. The classes typically begin with a review to remind the students of previous work and to make connections with what is to occur, followed by an explanation of what is going to be done, its importance, and why it is being done. Deborah usually guides the lesson with an easy flow from large to small group activity. A variety of activities is normally involved. There seemed to be an appropriate balance of review, instruction, practice, and evaluation.

Her organization is based on material she has developed; basal readers, for example, are not used in her classroom.

Illustrative Example

In the example that follows the patterns that have been discussed to this point are illustrated. It can be seen that Deborah is very much in charge when working with the group as a whole. She consciously controls the discussion and directs it.

D: Now I'm going to let you observe that picture for a moment and then I'm going to ask you some questions... When you're thinking you have to give full attention.

The first question: What can you tell about this animal from looking at these bones? Allen?

S: It's a dinosaur.

D: You think it's a dinosaur? How do you know that for sure?

S: It looks like a large animal.

D: It looks like a large animal? Mmmm...Ben?

S: It's white.

D: What are white?

S: Bones

D: The bones are white...Mmm...Do you think that's really true? The bones are white. How do you know that?

S: (not audible)

D: You've seen bones before and you know that they're white

S: Not perfectly white, they're off-white

D: Not perfectly white

...........can't hear...

D: So you think it's a dog rather than a dinosaur because if it was a dinosaur, that bones would be a lot larger...What can you tell about these bones? Kyle?

S: They are attached and they are broken.

D: How does the picture tell you that?

S: That the pieces are together.

D: The bones are attached, Mmm...What else can you tell me about the bones. Most people here are really thinking. My you're really quiet today, Marsha. Some bones are thin, which bones are thin?.........

S: The ribs.

D: Can you show us which ones those are in the picture? There's a sticker in the front if you can't reach it. Those are called the ribs. Do you know what any other bones there might be called? Tail, spine ...

D: Natasha, there's...sorry didn't hear what you said. There's thick bones, can you show us what a thick bone looks like? You probably will have to take the top. There's a ruler there that you can hold. So some people have said there are thick bones, thin bones, bones that you think are called ribs.

S: And there is another big one. Yeah.

D: Any other types of bones there that you think that you recognize?

S: Some bones are sharp.

D: Oh, can you go and point to the ones you think are sharp... What do you think they might be?

S: The spine. (several children repeat the word)

D: So you think they might be spine bones. Anyone know the names of the bones that we have in our spine?

S: Back bone.

D: Yeah, the whole bone is called a back bone. They're made of lots of little bones. Does anyone know the names of those bones? Kevin?

St.1: Chest.

St.2: Spine.

St.3: Spinal cord?

D: Spinal cord? Well, that's something that we can research, isn't it? Mmm. next question: What can you tell about what they are made of?

S: Bones. Several say and repeat.

D: What are bones made of?

S: They're heard.

D: Patrick. Marcia? any other ideas?

S: Sort of like. Umm. I don't know what it's called, but it's not very hard and sort of smooth right outside.

S: It's really hard, really hard.

D: So you are kind of getting into the feeling of bones. So you think that some parts of bones feel hard.

B: Yeah, right....if you break a bone, and it's got all these little holes.

S: And then there's this stuff filled in.

D: Hold on a second, Ben's got ... Ben, you think some bones have holes, right?

B: Well there's holes in the middle, but I don't know what the holes are for.

D: You don't know what the holes are for? O.K. Do you know where those bones might be that have holes?

S: Umm. Back bones....

D: Back bones, and you'd like to find out why we need those holes in the back bones.

S: I know.

D: You might have an idea? What's the idea, what do you think, Brian?

S: So your spinal cord can go through.

D: Why would your spinal cord go through the holes in the back bone?

S: Because it attaches to your brain and if your back gets broken, and if your back breaks and you get paralyzed, and you can't move anything.

In this section we may notice that there are few interruptions or instances of children trying to talk at once. The sequence is St-Deb-St-Deb-St.

Deborah appears to have no specific information that she wishes them to learn, or that she is attempting to convey herself. Nonetheless she seems to feel responsible for raising questions and new ideas. The interchange at the beginning moves the class from the characteristics 'sharp' to object 'spine' to names like 'back bone', to description 'little bones', to 'spinal cord' to texture to appearance to function or purpose. There is thus a series of observations or comments made by the students which are moved along by Deborah with little or no elaboration of detail. The children do hold on to the last idea of the effect of breaking the spinal cord and relate their personal experience at the end of the exchange.

Also the student answers are quite short, often limited to two words. The use of positive feedback and encouragement was also illustrated at the beginning of the sequence when she indicated to them that they were "really thinking". She can frequently be seen encouraging the children to think of answers which was quite typical of her teaching during this sequence.

Changes in the Patterns

During our observations following the intervention, we saw a number of changes in the instructional patterns within Deborah's classroom. Her role and that of the students in her classroom changed as did the general selection and use of materials and activities. To illustrate these changes we have included a second example of a group discussion which was typical of Deborah's classroom after the intervention. The sequence occurs during a group discussion after children have observed characteristics of ice. Their task was to tell what they had discovered about ice. After some discussion which raised a comment about the differences between frost and ice, one student noted that frost is so cold that 'it's hot and can go right into your skin.' Deborah restates:

Deb: Frost is so hot that it's cold and it goes into your skin?

Ben: Like dry ice. When you touch dry ice, it just burns your hand and when you put it in water, steam goes rising up and in a ....

St.1: Oh, I saw that on Scooby-goo. (Giggles)

Ben: Because dry ice is so cold, so cold that steam comes out.

cautions an interrupting student.)

St.2: Steam comes up. It's like clouds.

Deb: Can I hear one person at a time? There's so much going on here that I can't concentrate.

Ben: It's so cold that it's, it's really real cold in your hand, but it's really hot.

St.3: Like when you have a temperature.

Ben: When you put it in, steam rises, because it's making it cool, but if you put it in hot water, it just gets bigger.

St.3: Like when you're shaking and freezing, you can be hot.

Deb: So you're saying to me that dry ice is like a fever: you feel really hot and at the same time you're shaking 'cause you're feeling cold.

St.5: You are hot but you're so hot that you're on....

Ryan: Remember when we went to the technology center, that side you put

St.4: Yeah, that was dry ice and....

St.3: No, it wasn't.

(Deborah intervenes to stop interruption from Joey.)

Ryan: That water worked the same as frost. It was so cold and yet it could just get right into your hand if you touched it, if you put your hand it....

St.3: Sometimes you have to have your hand...

St.2: Remember she was holding it there.

Deborah intervenes in what has become a general chat.

Deb: Right, before we go back to look at the ice again I think I do have a little bit of ice left if anybody needs some.

Here we see more and longer student comment; students contribute different bits of information on the single topic. Deborah makes statements that repeat, rephrase, clarify, or synthesize. She asks only one question, which isn't even really answered, compared with six in the other extract. The second focuses on the shared characteristics of ice, frost, and dry ice and offers an elaborated, redundant examination of the topic which Deborah allows to progress, but does not seem to feel responsible for directing.

What we think important here is the teacher's stance. She herself describes her behaviour as listening and observing in order to learn about the students' understanding. She is conscious of not searching for 'right' answers. Her purpose in having the reporting session is less to evaluate what the children have done than to determine what their present understanding is and what it has prepared them to do next.

The pattern in these excerpts is typical for the thinking skills lesson. Since the purpose and topic of the lesson was different, we need to examine the significance of the difference in the pattern. We think the significance is related to Deborah's declared purpose in taking the course, and to what seems to have emerged in her teaching. She aimed to become more of a facilitator than instructor in her class and to teach thinking skills. She defines facilitator as someone who provides materials, pulls information from the students, extends their vocabulary by paraphrasing using new terms, encourages students to reflect on what they have said, and gives bridging suggestions rather than to quote her: 'putting words in their mouths'. The transcripts indicate that she is successfully assuming that role; but she commented that she has yet to work on minimizing the class time she spends as instructor.

What she reports about the problem-focused coursework suggests that she gained awareness and understanding that are enabling her to shift her stance and be a facilitator in the classroom. During the course, she coded her own responses during discussion and noticed the effects on students of clarifying responses. The coding made her attend to detail, and listen more carefully to what the participating students told her. She saw many students become better listeners and more respectful of each other as sources of knowledge and experience. The modeling lesson provided by her instructor also highlighted the nature of the teacher's role.

From being fearful of science teaching, she has become confident since she now sees the teaching as engaging in enquiry processes with the students. That she herself does not know the answers to their questions nor feel responsible for being a source of information seems to have been a freeing experience also. She has assumed responsibility for the thinking skills which need to be applied to the discipline, rather than responsibility for teaching the factual information which constitute it.

As we said at the outset, these observations were made tentatively. Six months later Deborah saw herself as continuing to develop and affirmed her confidence in the thinking skills approach as "the way to go."

Deborah's Comment

I felt my study of the 'case-study' agreed with your representation of what happened in the classroom and the discussions afterwards.

From our conversation I realised how helpful it was to receive a copy of your observations, to digest later and reflect upon our conferencing. Personally, I find it more gratifying in coursework to work from practice to theory, rather than the other way 'round. It was also a great help to explain my work to a knowledgeable, sympathetic, yet not too overbearing person who outwardly appeared very interested in my project. It crystallized my ideas in action and gave me personal time to voice concerns or ask for help.

I found the informal small group gatherings which were held to be informative, supportive and generated additional ideas for problem solving or extension of original ideas. One never felt alone or isolated as is often the case in a typical classroom setting.

After this course I continued on with an additional course, directly related to my 406 experience. My future plans, after a period of practical implementation, are to study "Teaching for Thinking" at an even greater depth.

CASE STUDY - BARBARA MILLS

Teacher's Professional Background

Barbara has been teaching for ten years at the lower elementary levels, Kindergarten to Grade Three. At present she teaches a combined Kindergarten-Grade One class at an urban Community School.

She began her professional training in the Professional Development Program at Simon Fraser University where she earned a teaching certificate. In 1978 she returned to get her B.Ed. degree and is currently working for an Extended Studies Diploma.

Barbara draws on several sources for help in improving her teaching. As well as the course-work which will upgrade her certification and offer stimulating ideas, she turns to teaching colleagues for ideas and assistance on a day-to-day basis. She takes in-service courses on topics that seem to offer something useful or interesting such as P.E., drama, process writing and French. When the school had a temporary art consultant, Barbara sought help since she felt her art lessons were haphazard and had no sequence. Some of the ideas worked out well, but since there was no opportunity for the consultant to observe and give concrete advice and constructive criticism, Barbara found she made only a temporary change in her lessons and generally went back to her usual way of teaching. Occasionally she seeks help in the way of materials and ideas from the District Office, or will use an idea in a local professional journal if she happens to find one. She reads educational journals only if they are conveniently available. After a few years of teaching, she concluded that the journals had nothing new to offer so she stopped buying them.

Context for Participation in Research Project

Barbara became interested in the SFU 406 problem-focused course as a result of having taken a science methods course in the fall of 1984. She is generally concerned about improving her teaching but was particularly interested in changing her approach to science. While there was no one at her school with whom to collaborate or share in this interest, she thought the 406 format would offer useful assistance in implementing the new approaches. The research project seemed to offer a way to get additional feedback and views of her teaching not usually available to her. Although she had not been involved in a research project before, she wanted to feel a participant in it, not an object of study. She objects to research that neither involves the teacher nor recognizes the teacher's contribution; or research done by persons who, unfamiliar with the realities and complexities of the classroom, do not understand the meaning of what is going on.

Barbara decided at the outset that she would try to implement the inquiry approach suggested in the science methods course. She already felt conscious of her teaching processes and was critical of the way she asked questions, directed the children's behaviour, and provided tasks for the children. She wanted to encourage greater autonomy and self-direction. She thought that giving the children more choice of materials and task options, making her questions more open-ended, and being less concerned that they 'get it and do it right' would encourage individual initiative and extend thinking skills.

Barbara thought it important that the children think things out for themselves and state their understanding in their own words. At the same time, she wanted to feel more certain of the value of activities she had planned and to know what the children were gaining from their work.

School Context

The school is located in a multi-ethnic district of the city, close to shopping streets and main traffic throughways. The elementary school is part of a larger complex which includes a high school, football fields and parking areas. The elementary section is built on an open plan with classes or groups separated by portable shelves and cupboards. Access and movement from one area to another is thus easy, but also intrusive on groups who are working. The principal seems to view his role as a managerial one and, in Barbara's opinion, he acts as the means by which Board policy is implemented. Barbara has little sense of his understanding what she does in her class, and finds his apparent lack of interest discouraging.

Support from the community is given by senior citizens who come to help with materials preparation and child supervision and by a community worker who brings in musicians and artists. Parents are generally supportive but most are not available during the day to offer classroom help. They show their interest at Parent's Night and by their response to progress reports on their children.

Class Context:

Barbara has a combined Kindergarten-Grade One class of twenty-seven children. They are of mixed ethnic backgrounds with a high proportion of Asian children, some of whom do not speak English at home. The emphases for these children and all those in Kindergarten are on socialization and acquiring language skills. Part of the socialization includes looking after the classroom and observing routines such as lining up. All children participate in the collective responsibility for tidying and for taking care of materials.

Not all of the children are with Barbara all day. Five ESL children spend time in a special class in the afternoon and the Kindergarten children leave at noon. Thus she has a small group of 12 for science during the last hour of the day on Tuesday nd Thursday. She planned to make some changes in her teaching within the context of these science lessons.

Patterns Observed in Baseline Data

Role of the Teacher. Barbara is an organizer, manager, instructor, evaluator and problem-solver in the classroom. She groups the children so that she can be teaching one group while others are usefully occupied. When all are working individually she walks around the room offering suggestions or identifying inaccurate work. She is quietly in control, handling individual discipline problems unobtrusively, and constantly monitoring children's behaviour and work. She leads discussion or question-answer sessions, and is the focus of most of the children's response in the large group setting. Her manner is calm and patient, but she says she feels frustrated by the amount of attention required for procedural and management tasks that she would like to give to instruction. The physical set up of the classroom is more distracting, she thinks, than a closed room would be.

Barbara perceives himself as a more competent Grade One than Kindergarten teacher and she was concerned that she was not providing adequately for her younger students. She wants to see herself as a more effective teacher, by which she means better than she is now, and she sees it as part of her professional responsibility to continue to learn. She takes time to analyse her own strengths and weaknesses and tries to be conscious of the techniques she is using and how they work. Self-motivated, she sets expectations for herself.

Planning. Barbara's lessons show clear evidence of her preparation. She has materials ready: booklets made, worksheets copied, and equipment assembled. The sequence of her lessons included a review from the previous day, directions and discussion of technical words being used. Whole group explanation was followed by individual practice, and the class concluded with whole group sharing. She seemed to have thought out her directions for new activities and arrived at a rationale for what she planned.

Role of the Students. The students participate actively in all the tasks set them. They seem interested and willing to work, are well able to follow routines and take responsibility for their own materials and books. Some who are particularly successful in their work serve as models and buddy-helpers for others. They either show what they have done in books, or demonstrate a process, e.g., measuring.

The children are expected to move around the room freely and both assist in and comment on each other's work. Some children occasionally adopt the teacher role and comment on inappropriate behaviour.

The children are accustomed to visitors. Both students and parent aides come into the class and parents arrive sometimes unexpectedly but do not seem to distract the children. Any adult seems to be seen as a source of assistance and children came to the observer to check their work as well as to ask for help.

Interactions. There is much student-student interaction as children confer with each other about their work and serve as audiences for each other.

Teacher-student interactions occur while the children are working and the teacher walks around looking and checking. In the whole group sessions, the teacher calls attention by naming 'who is here' and commenting on desirable behaviour such as sitting straight or still or having brought the right book. Most such discipline and management comments occur while the group is getting organized. During review and teaching times, the pattern is mainly teacher-student, with occasional student questions or unsolicited comment. The children seldom respond to each other in this setting, but do not disrupt others while someone else is answering a question. They sit quietly and appear to be listening, and raise their hands when ready to respond. They occasionally chorus a group response to questions, a few leading the way and others adding their voices.

Evaluation. There is continuous evaluation by the teacher and aides who correct workbooks or comment on quality of work in notebooks. Children correct errors that are pointed out to them and will sometimes rewrite or redraw when their performance has been unsatisfactory, and doing the work again would be helpful to them.

Much evaluation is oral in the form of teacher or student-student comment on specific aspects of the work and by means of quizzes during review of previous lessons.

The children also evaluate their own performance, as during listening to a story when they rated their own concentration and awarded themselves stickers.

Organization of the Class. The children move readily from whole group to small group, individual, or partnered activities and back to the whole group. They sit on the floor in a cluster during the whole group instruction and move back to round tables, each with 5 or 6 chairs, to work individually. They do not appear to have set seats or places, though some children sit together regularly.

Because it is a mixed Kindergarten-Grade One, the class is organized to work in several 'spaces' in the classroom area, and there is a place for manipulative play, a place for reading, and a place for listening.

Illustrative Example and Discussion

Barbara planned, as her coursework project, to introduce a discovery-approach to science. In the first series of observations, Series A, the science topic dealt with was measurement.

In the measuring lessons, the children had a choice of objects. From a selection of things that Barbara pointed out to them, they were to select several to measure, or they could choose something else, as long as it had the requisite characteristics. Given the directions, they worked on their own, assisted by Barbara and sometimes an aide, both of whom walked around the room commenting and answering questions. Toward the end of the session, Barbara gathered the children together again and had them share, at her prompting, what they had done. Some talked or showed labelled drawings, others demonstrated.

At an after-class interview during this period, Barbara explained what she was intending to do and what she regards as constitutive of a discovery approach: The lesson is less directed than in the past, and more student-focused. She was giving them a lot of choice of things to measure and letting them experiment on their own for a lengthier time. She is giving them 'more gentle guidance'. Previously, she said, she would have "shown them where the 'width' is on an object and given them things to measure" because she felt anxious to make sure they did it right. Now she is trying to hold back. "Because in the long run, if they are going to learn something, they'll probably remember it more (if they figure it out for themselves). It gives them a sense of autonomy too.... The children seem happier choosing what to measure."

In the interview, Barbara was referring to a lesson in which she had provided a context for learning within which she hoped that the children would begin to understand the meaning of width. She had instructed the children to measure the 'round part of round things', not measure 'up and down'. She pointed to objects such as buttons, a clock, a drawing of a snowman, and a ball to indicate the range of roundness acceptable. The children were to use both tapes and rulers. They had already had several lessons on measuring using both standard and non-standard measures. They were thus ready for tapes and rulers. Barbara did not model how to use the tape or ruler to measure the round part. She wanted them to find out for themselves what would be necessary, and thus to 'discover width.'

The children went off with their tapes and variously measured circumference or diameter, either of which was acceptable. Barbara did not consistently redirect them nor distinguish two and three-dimensional objects. She did help individuals to do the measuring, and pointed out to a couple of children the options of measuring the circumference and diameter of a free standing two-dimensional clock. When they gathered in the large group to discuss their work, Barbara encouraged them to tell about their work with such questions as:

> "What did you find out?"
>
> "Did anyone use anything different?" (from the tape)
>
> "Any comments about that?" (measuring a ball with ruler)

She then attempted to have them label the day's measuring task as "width".

B: "What was different today about the measuring? Anything different?"

S: "We used tapes and all the things were round.

B: "Were we measuring height?"

Ch.: "No."

B: "What were we measuring? Tania, show us what you did with the clock."

Tania got the clock ... and measured across the clock.

B: "Was she measuring up and down?"

S: "No, sideways."

This exchange continued, with Barbara referring to someone else's measuring a circumference and then Barbara showing the difference between measuring across the flat diameter and the circumference. She then said:

B: "We were measuring width," and wrote the word on the board.

B: "Who could measure Tania's width?"

Tania stood waiting. Chrissie took the tape and measured Tania's height.

B: "What is she measuring?"

Ch.: "Height."

B: "How could we measure width?"

Sarah put the tape around Tania's waist.

B: "What is Sarah doing?"

S: "Measuring width, measuring around."

In her effort to let the children 'discover width', Barbara chose objects that would not have an obvious up and down measure so that the children would be distracted away from height and thus discover width.

In our after-class discussion, Barbara said she was not satisfied with her closing questions. She thought they needed to be more inquiry-type. She felt she worded them in a way that was directed, that indicated the answer she wanted whereas she wanted to be more open-ended. She wanted them

> to discover that we weren't measuring height any more, but width, that they realize it was width ... if I'd found them going in that direction as well ... they'd be working with measurement in that, too ... I wanted to introduce width but if they went some other way that might be more relevant for them, I'd let them do that too since it is still to do with measurement. This way was different from before. It's hard seeing them do something other than width. I would have redirected them back to width. This time I wanted to see what they could come up with. Now I know where to go next time. I'll use Sarah and Tania to show what width is, and we'll go from there.

The next lesson followed up on this, but began wih discussion of width with the word written on the board, a demonstration of measuring the width of a table, and directions to measure and record with a labelled picture. The children measured the same mixture of round and rectangular objects as before, although the ball appeared to have been withdrawn. Barbara felt a majority of the children were making a clear distinction between width and height and were coming to understand about measuring in general.

In the first series of lessons observed, Barbara was making decisions about the focus of the lesson but allowing the children to interpret that focus and to find things out for themselves that might or might not be related to it. She offered choices within the task and accepted any interpretations.

Changes in Patterns

During the second series of observations Barbara was still working out a discovery approach, but had had the addition of the coursework and the monitoring and feedback of the faculty associate to help her implement it. The topic of these lessons in the second series was seed and plant growth. The class watched some short films about seeds and plant growth and then each child chose seeds to plant in a pot. Over a period of weeks, they all recorded the growth of their seeds through labelled drawings in teacher-made booklets. Each lesson began with a review of some aspect of the work done previously, either of content or processes. The children then talked about their seeds, in pairs, small groups, or in the whole group, and from the discussion went to the tables and drew the things they had noticed about their seeds. At the end of the lesson, the children returned their booklets and cleaned up. In the sessions observed, the group did not reassemble as a whole again.

As in the earlier lessons observed, Barbara concentrated on trying to be less directive in her questioning and to give the children options whenever possible. She referred to asking "open-ended questions" and appeared to interpret that to mean questions which did not lead students to the correct answer, and response from her which accepted whatever the child said. Thus, in a review of a film about seed growth, she began by asking simply: "What do you remember about the film?" In response to this question the children offered descriptive details. Rather than actually just accepting the information volunteered, however, or commenting on it, or making a contribution of her own, Barbara followed with questions which asked for explanation of these details -- why? and how? She was thus initiating the review with an invitation to random, individual contributions which might resemble talk in a conversation, but quickly focused in ways which asked for a different level of attention and response from the child. She saw this as a way of promoting higher level thinking skills for which some children were ready. The length of children's answers in the question-answer pattern dropped to three or four words from the ten or more offered for remembered details.

In the segment below, the difference is very apparent:

T: What do you remember about the film?

Bradley: Sunflower seeds ... the seeds were all big and too close together and they needed to get cut off. (18 words)

T: One had to get cut off. Why? Raymond? Why did one of the sunflower seeds have to be cut?

St: Because they might die? (4 words)

T: Why might they die?

Gerri: Their roots get tangled together. (5 words)

Mary: I eat sunflower seeds. (4 words)

T: Yes, some people do. You usually don't eat the whole seed though ... What do you remember, Margaret?

Margaret: There was some soil and after one week it would grow. (11 words)

T: What did the girl need to make the plant grow?

Chorus: Soil ... water ... sun ...

T: What else do you remember?

Melissa: I remember that ... the things that stick to your clothes ... (10 words)

T: What are they called? Do you remember the name of them? (no reply) They're thistles. What do they do?

Melissa: They stick to your clothes too much. (7 words -- repeats her idea)

T: What happens when they drop in the soil?

St: They grow. (2 words)

T: Do you remember some ways in which the seeds travel?

St: The wind.

St: The water.

The same pattern was evident in the review which followed another film shown that same day. "What did you see?" encouraged details and an extended response but more focused questions: "What else did they grow?" got one or two word answers. Although the children themselves mentioned only a few details from this second film, Barbara did not remind them of any other information. In a post-class interview, Barbara explained that what she herself remembered 'may not be meaningful to them' so she did not remind them of other things in the film which she had noticed. In this way, she said she "decreases her input" and makes the class "less teacher-directed." She also said she did not expect lengthy answers and "realised that some wouldn't be able to answer at all."

If we examine the reasoning behind Barbara's decision not to supply information in this context, we see it is consistent with her wish not to influence the children's responses only because she is not taking the effects of her questions into account. She pursues ideas raised by the children as cues to probe toward key points in the film. Thus, she responds to the comment about soil and "after one week it would grow" with a general question: "What did the girl need to make the plant grow?" Such a question does not acknowledge the child's connecting soil and growth but appropriates her idea in the service of the teacher's own intentions for the discussion. While she may recognize the child's connection, she does not follow it up to allow elaboration, nor let the child know what she has heard and understood. Melissa's observation about sticking thistles leads to a question from Barbara which is unrelated to the child's idea. With this kind of response, Barbara is not participating with the class in an open-ended, listening-to-each-other kind of conversation, but taking the role of teacher as tester. The children respond by guessing at answers. Barbara, however, interpreted their answers as "appropriate to them, given their experience."

The guessing at answers occurs in another context which is similar to the episode described earlier about measuring width. In that case, Barbara chose to resist naming the dimension the children were measuring. In a later lesson during Series B, she went to similar lengths to withhold a word. In this latter case, however, the intention did not appear to be to have the students discover the concept. Rather, the withholding was part of Barbara's strategy of not directly critiquing and of not providing helping connections in whatever the children said about the topic being discussed. If an idea or word did not occur to them when they were given an opportunity to talk, she chose not to supply it, as the following excerpt from the transcript shows:

Barb: O.K. are we all ready? No Ina just asked a question: Why did we put the seeds near the window? and David said that because we get sunshine. Can you think of anything else they get through the window now that you are here and that you are able to see the window and where the seeds are Jill?

St: They grow.

Barb: Listen to the question though - what else do they get by being near the window? They get sunshine when the sun is out but what else do they get besides that sort of thing, the heat and the warmth from the sun?

St. They get fresh air.

Barb: We said that they could get air from anywhere, no matter where you put them. Air is all around us. We don't have to put them by the window to get air.

St. But they need sun.

Barb: They do need the sun ... David?

St: When they don't got sunshine, they won't never grow.

Barb: What does the sun give us besides heat?

St: Hot.

Barb: What happens when the sun isn't out?

St: Cold, very cold.

Barb: What else.

St.: Cold and cloudy.

Barb: Is the sun out at night.

St. No-oooooo.

Barb: Is the sun out in the day time?

St: Yessss.

Barb: O.K. so what's the difference between night and day?

St: Day night.

Barb: Pardon me? What did you just say?

St.: Day night.

Barb: What did you just say?

St: Day night!

Barb: O.K. Well, does anyone else want to try? O.K. well maybe it will come to you later on.

In this series of exchanges, no one suggested the word 'light' as being necessary for plant growth, though one child seemed very close to it. The only verbalized association made with sun was sunshine, which Barbara earlier on interpreted as heat and warmth. Since she was unable to elicit the word, and appeared not to think of sunshine as possibly encompassing heat and light in the minds of the children, she later in the lesson elicited the word with a demonstration rather than say 'What about light?' She and her aide switched off lights and closed the blind, asked what the change was, then raised the blind and asked what else plants get besides sunshine from the sun. Even after this demonstration, a series of twenty exchanges was required before the children guessed what was wanted; the word 'light'.

In this study of plant growth, the children need a concept of the importance of light just as earlier in measuring dimensions they needed a concept of width. In both situations, Barbara wanted them to produce the word themselves. We unfortunately do not know how she would have interpreted their supplying the word spontaneously. Their saying the word at once could not be interpreted to mean that they necessarily grasped the nature of the importance of light to plants. They may recognize in a general way that plants need light, for instance, without knowing why, or what happens when light is withdrawn. Equally, it is difficult to think that she is not sure whether they know the word and what it means. In either case, the search for the word seems puzzling. It appears that Barbara was so intent on the word she wanted to hear that she did not take note of perfectly adequate replies or alternatives such as sunshine which could be interpreted to mean the same thing. Or, if she did note them, felt unsure that the children would interpret them to mean the same thing. The children thus seem confused and do not know what they are expected to say. Since they know the word light, this questioning procedure may cause them to doubt their own knowledge. In such settings, as Tizard argues in citing a very similar incident, they may well be "getting useful preparation for school, and ... the ability to work out what answer the teacher has in mind will serve them well later on."

Since this is one of the things that Barbara was working toward avoiding, we may conclude that in this respect she is still experimenting and her practice does not yet reflect the intended change. She herself recognized that her efforts to encourage more student talk were not achieving what she intended, so she experimented with different groupings of students.

One of the routines in the lessons on seed growth was the trip to collect the pots from another classroom where they had been placed on a sunny ledge. Barbara noticed how excited the children were after retrieving their pots, and how much they talked in the moments in between their return to their own room and her bringing them to attention. She planned, therefore, that they would initially share observations and ideas about the growth of their plants in small groups, rather than with her. The children began by working in two's and three's and examined each others' seeds with much interest and talk. When brought back to the whole group and led by Barbara's questioning and prompting, they did not volunteer ideas or ask questions, but were able to respond on request. Barbara noticed the difference in their participation and wondered whether the whole group exercise was merely repetitive and thus uninteresting. In the next science lesson, she omitted the whole group review instructed the children to observe their seeds closely and talk with a partner about what they were noticing. Although she and her aide were available to assist, the children talked among themselves for several minutes before taking their science notebooks and sitting down to record the changes in the seeds. This talk was focused on the seeds but not structured by teacher questions. The small group activity was followed directly by individual work instead of whole group sharing.

A similar pattern occurred in the final lesson observed in the series. The children talked among themselves, in partners and small groups, now and again sharing with Barbara, continually regrouping and mingling. When they felt ready to record they went to Barbara to get their note books and then sat at the tables to draw and label, assisted by Barbara and the aide.

Barbara's experience and the pattern of her questioning correspond closely to the models described by Barbara Tizard as typical of teachers. It produced the same limitations which Tizard suggests are particularly undesirable in the early school years. Teachers tend to lead 'discussions' with particular information or ideas in mind that they want the children to know and produce. Instead of a give and take conversation, where both students and teachers contribute ideas as well as questions to which they do not already know the answers, they engage in a testing sequence. The children's task is to determine what the teacher is looking for. Such a testing sequence does not allow the teacher to "pursue any inadequacies which are exposed in the child's understanding" (Tizard, p. 197) because she is intent on securing answers. Barbara recognized that her questions were not encouraging the kind of talk she intended and she blamed her own questioning techniques. It appears, however, that the questioning process itself may be inappropriate at this level, and that Barbara's alternative of allowing loosely structured student-student talk within a well-defined context is the more effective strategy. Although Barbara herself did not articulate such a view, she changed her planning to allow for more student-student talk, and also assumed a different role when talking to the students in their small groups. She contributed to rather than led the discussion. She was aware, also, of her own need for control when handling the whole class. In her comments on the final observation session, she began to resolve the conflict between her way of acting out that need and her objective of helping the students become more independent. She remarked on the atmosphere and disarray or disorder which she had reacted to when the children returned to the room with their pots. They had been exclaiming excitedly over the earth and the seedlings, and laughing at each other's reactions and comments. She had seen this situation as a discipline problem and immediately began an effective strategy to bring the group to attention under her direction. She clapped her hands in a simple rhythmic pattern and the children responded by putting their pots down, sitting, and following her lead. She continued until they were all assembled and Barbara could then explain what they were to do.

Barbara realized that she was the one providing a stimulus to which the children would react. They became excited about their plant pots and involved in talking about them; when she introduced something else to respond to, the clapping, they were diverted and began to clap. She described these two responses as similar because they showed that the children would respond to "whatever is in front of them." She added that she wants to see the apparent discipline problem differently: to view what the children are doing as legitimate activity, and to withhold judgment on it until she has decided whether it is in fact legitimate. At present she reacts quickly to gain control because of the open-classroom setting and the proximity of other teachers and children trying to work. She is, however, trying to be aware of what is really going on. She is concerned with such questions as: "Should I let the kids do more on their own?" and, "How much teacher-direction has there been?"

In allowing the children to talk in a relatively unsupervized fashion, Barbara had to relinquish her leading role and let the children become comfortable with her new approach. Although initially reluctant because she could not monitor the children as closely, she saw the need to do so. She was thus acknowledging the value of the talk and the fact that the children talked more fully when not constrained by trying to figure out what she wanted them to say, as was the case in the questioning session. As she reflected on her actions in the last session, she was seeing that she can choose how she uses her control, and may thus use it for ways other than discipline.

It seems unlikely that the changes observed in Barbara's teaching would have occurred in the context of the previous science lessons on measuring. In part this is due to the nature of the topic. The concept of width is an abstraction which emerges from a mathematical system. This system is not open to the kind of interpretation that is appropriate to interpretation of the natural world. To observe width involves recognition and application of a concept whose meaning remains fairly constant. To observe plant growth, however, is to notice change and differences and it is out of this noticing that understanding of the concept emerges. The nature of the phenomenon thus probably triggered the increased discussion.

Conclusion

In following through with her project, Barbara seemed to reach a point of greater awareness of herself as teacher and of the participatory role of the students in their own learning. At first she focused almost entirely on questioning techniques as a means of encouraging student talk and sought to ask 'open-ended' questions. She seemed to come at the end, however, to a tentative realization of the children's ability to discuss topics in a full and open way without prompting by questions. Her role was to provide the setting and the opportunity.

During this process, her role as a teacher was modified. She became more facilitative than directive when not working with the whole group. In this latter setting, she attempted to facilitate, but her conceptual grasp of 'open-endedness' in questions was inadequate. She asked such questions inappropriately in search for words, and was unable to respond to the sense of what the children said, rather than to the form or structure, or to react as a person-listener, rather than teacher-testing. It is likely that her indirectness was more confusing to the children and thus inhibiting than her previous giving of direct evaluative 'right and wrong' response to answers. That she recognized there was a problem, although unable to attribute the cause, represents a valuable awareness. The problem itself may be seen as the step in the change process when newly acquired learning is not yet assimilated into individual understanding.

The role of the students in the class began to change as they were given more responsibility and more opportunities to depend on their own efforts to arrive at understanding. Their role was related to changes in the interaction patterns which encouraged more student-student talk which in turn formed the basis for the individual work. The class was organized differently to accommodate this interaction. Barbara omitted the whole group review both during and at the end of the lesson, using the whole group time at the beginning to remind and to establish the plan for the day. The nature of the class, the methods of evaluation, and planning remained the same over the two observation periods.

Barbara reported that the problem-focused course, in particular the feedback from the mentor-teacher, was especially valuable in helping her reflect on her teaching. The course provided the opportunity and the structure for such reflection. She valued also the research team's written descriptions which gave her a sense of how she works with the children. She felt that change can be accomplished by examining and reflecting on teaching practice, but that such change needs to be recognized or rewarded in some significant way if teachers are to be motivated to do so. "If teachers don't feel that it matters that they change, and they can manage their jobs and do perfectly well, or acceptably, without changing, why bother?" She herself saw a need to change her practice in teaching science, had learned new approaches in a science methods course in the fall, and wanted to use the problem-focused course as a way to implement them.

Barbara's Comments

The case study is informative because it provides insights which attempt to describe positives and negatives in my attempt to bring about change in my teaching style. Reading the study helps me to further question why and where some changes still need to be made. I find it also gives suggestions as to how to implement these changes. It is beneficial for me to be able to read as a whole, the complete experience of the research project in the case study. This provides a scope which was not possible to achieve from the individual teacher-faculty associate meetings which occurred after the in-class observations.

I feel it is important to mention that one particular teaching style (i.e., the less teacher-directed approach) is not always suitable for all children. More realistically, the teacher should make herself aware of what works most effectively with individual students, and adapt a teaching style suitable to their needs. This may involve a more directed teaching approach. I find it rather difficult to accept generalized statements as those attributed to Tizard on pages 13 and 14 of this study. Her research can only be conclusive, if at all, to a degree. I am left with reservations about her comments especially as to how they would apply to the particular children in my classroom.

CASE STUDY - Wyona Sewell

Teacher's Professional Background

Wyona is currently in the fourth year of a five year baccauleareate program in education. She is working toward a major in history. Since completing her teacher preparation in 1976 as part of that degree program, she has completed the equivalent of a minor in learning disabilities. This minor includes, among others, courses both in the theory (Educ. 422) and practical application (Educ. 424) of teaching in that area. In addition, she has taken courses in counselling (Educ. 425), reading (Educ. 473), history (French revolution and museum use), and psychology (psychpathology).

She became interested in children who have behavior problems when she worked as a cook at a school for deliquents operated by her brother, a probation officer. The experience impressed her both in terms of her own resources and in terms of the value of the outward bound experience for children.

She then began substituting in special classes before receiving her first appointment four years ago in a suburban school district teaching in a social adjustment class designed to assist children with behavior problems adjust to regular classrooms.

Context for Participation in the Research Project

Wyona was asked to join the research project because of her enrolment in Education 406 which was being conducted in her school district. She had enrolled in the course to improve her teaching of language arts. (The project on which she focused as part of the course involved watching the reactions of a single child to the process of reading aloud to the class. The person instructing the course had advised her to try the extended period of reading and simply find out what would occur.)

A supervisory person from the district visited her room as part of the Educ. 406 on one occasion. This person watched her teaching, examined the materials that were being used, perused her daybook, and gave her feedback on what she had seen. Wyona had found that to be a very useful experience.

School Contex

The school. Sunset school is a relatively new elementary school situated in a growing residential area having both middle and low income families. It is located among newly constructed houses in the area and about one kilometre from a large shopping center. The principal is supportive of research. Our own observations within the school appeared to suggest that the parents were quite involved with their children in the school at least to the extent that they were around a great deal. The atmosphere around the school was friendly.

The class The class was termed a social adjustment class consisting of five boys of primary school age. All had been identified as behavioral and/or motivational problems. Apart from such problems they were reported to have normal abilities. Some of the children spent time in other classrooms on a regular basis.

The aim of the class was to provide children with the social and behavioral skills as well as the discipline to work in academic areas in order that they could reenter the regular classroom. Wyona saw her approach to instruction and discipline within this context. She indicated that she felt under pressure from the supervisor who wanted her to conform to certain ideas and from the principal who wanted her to maintain control in a way that produced a certain degree of quietness in the classroom.

The approach that had evolved in her classroom as a result of this pressure **was not** one she would have preferred; she explained the need "to produce quickly and have quiet in the classroom whereas at one point I would have worked through in a more exploratory way." When asked to expand on this point she indicated that the children might have been given more freedom to find their own dicipline. We drew the inference here that this was in opposition to the type of imposed structure and discipline that she saw herself needing to apply.

Patterns Observed in Baseline Data

Role of the teacher. Wyona sees her role as existing within the overall purpose the school and the district have for children in classes such as these, namely to assist them back into a regular classroom. Because they require certain skills, self control, and discipline to make this transfer, her role is that of a strict disciplinarian. The use of time-outs (children are sent to the rear of the classroom to sit by themselves), the chart on which colored stickers are placed at various times during the day, the clock timer that is set from time to time, and the use of praise all appeared aimed at maintaining discipline. The time-outs occurred often and regardless of the particular lesson in progress.

Wyona was courteous, restrained and very formal, rarely engaging in any spontaneous activity or showing emotion. She was distant and clinical in her approach and at times almost appeared to be playing a role that was not to her own liking. Her role in this case was obviously seen as directing the class and maintaining the well established routines.

While her role in the classroom was influenced by external pressures, it was also a function of her own belief in schooling and her views of certain content areas such as English. During an interview, she said she saw schooling as establishing a type of order and discipline for children which had worth and value in itself. At the same time, however, Wyona described herself as wanting to develop a relationship with the students so that they would feel her support as they learned the demands of the adult world. Our observations indicated that on most occasions this view (maintaining order) dominated her role in the classroom often at the expense of teaching in the subject areas.

Wyona's regard for literature was evident by the fact that part of each morning was devoted to the reading of poetry, much of the teaching that was observed however was very rote oriented in nature particularly with regard to the poetry. A somewhat different level of questioning was in evidence in regard to the work with the story reading which occurred in the afternoon. Generally, however, she used direct instruction to provide skill in academic areas.

Planning. The room was filled with charts and aids of various kinds indicating an accumulation of materials over time. The normal teaching aids and workbooks were in evidence and in use. On all occasions that I observed the class, the poetry to be read that day had been copied on to the blackboard. Transitions from one class period to the next occurred smoothly. On occasion, Wyona left the room to copy materials for the class. A fairly constant pattern of instruction and management had been worked out which did not change to any great extent during the time period under observation.

Role of the Student. The student's role was one of compliance, mirroring what Wyona perceived to be regular classroom routines. Orderly discipline was encouraged perhaps to the detriment of spontaneous and creative expression.

When the students were in charge of certain activities such as the weather check or the alphabet clap, they would insure that their peers complied with the routines before they proceeded.

Student initiated comment was not encouraged although they frequently spoke up and occasionally engaged in conversation among themselves. This type of talk appeared to be contrary to expectations and frequently warranted correction.

Interactions. The most common types of interaction observed were those of a teacher/student nature initiated by the teacher. Most of the exchanges were of a question/answer type. Such interactions appeared to occur regardless of whether the teacher was speaking to the class as a whole or to individual children. The emphasis tended to be on the exact answers to questions. Also, Wyona tended to repeat answers a great deal. The following sequence was typical:

> "O.K. lets go over our poem. Who thinks they can read accurately the poem we have written?"
>
> Wyona explains the process by which which she will read the poem to the class. They then echo read as she reads one sentence and the class repeats it. They then read the poem together. Wyona then explains what they will do next week.
>
> The procedure is then repeated with R.
>
> Wyona then asks the class what does six-sided silver stars mean. One of the boys replies, "It means that they have six-sided points."
>
> "What has six-sided points?"
>
> "The stars."

> "The stars? Are they stars? Robin?"
>
> "The snowflakes."
>
> "The snowflakes. Why do they call them stars?" Some discussion follows. Wyona then confirms that Robin thinks they come from the sky.

Interaction was observed to be occurring among children but this was outside expectations. The children asked questions about procedure, but rarely about content.

Evaluation. The student's work and behaviour were constantly being evaluated by the teacher and by other students. Praise, time-outs, the circle chart, and the clock timer all served to evaluate different aspects of student performance during whole class instruction. During the one-on-one teaching situations the feedback to the students focused on particular academic tasks, and reflected meticulous attention to detail.

On occasions, particularly when students were leaving the room to go to another, Wyona was observed to ask them what kind of day they were going to have.

Organization of the class. The physical organization placed the boys in three widely separated rows of desks. This seating arrangement occupied much of the room and bore a close resemblance to a regular classroom. The teacher's desk was situated on one corner of the classroom near the door. At the back of the room were three carrels one of which was frequently used for time-outs.

The first morning reading period began with one student explaining what day it was. (For example, "today is Monday, June 4th"). Another boy would then explain what yesterday had been and what tomorrow would be. ("Yesterday was Sunday, June 3rd and tomorrow will be Tuesday, June 5th"). The weather check came next during which time another boy went to the side of the room, looked outside, then proceeded to record the day's weather pattern on a chart. Often this produced some interaction particularly when the observation did not relect the day's weather conditions. We did not observe any discussion of the cumulative results. The weather check was usually followed by the alphabet clap during which the boys stood while one led by saying each letter and sound while clapping in rhythm. ("A is for auh, B is for bu, etc.") This pattern did not vary to any extent during our morning observation periods.

The next activity was usually the reading of poetry which was on the blackboard. Wyona would sometimes read the poem aloud and at other times call on the children to read, depending on the amount of time they had spent on a particular poem. On most occasions the children echo read (reading a line after the teacher had read it). The utimate goal of the activity appeared to be to have the children recite the poetry.

Following the poetry reading the children then worked on assignments in either their workbooks or on worksheets provided while Wyona worked with individuals.

Illustrative Examples and Analysis

The following excerpts illustrate certain patterns evident in Wyona's teaching during the period when baseline data were being collected.

a. (Field notes - 21/Feb/85 - partly through the morning period)

Wyona asks M who is looking for a pencil to take out his worksheet. He does and goes to the back of the room. Later when he has returned to his seat, Wyona speaks to him about his work:

"M, I am going to give you two counts to get settled down and then I am going to give you a time-out." He makes an effort to get on task.

Wyona is now listening to D. read. At 9:45 the timer on her desk rings and Wyona goes to the front of the classroom and places a star on one of spaces beside a child's name. Without comment she then continues to work with D. "O.K. D., you were having trouble with this yesterday."

* * *

b. (Field notes - 25/Feb./85 - midway through the morning period)

"Let's do our weather poem. I want all to go over the poem this morning. Pull up your chair please D." Wyona read the poem aloud, pointing out the words. The children repeated it after her. R. then read the verse on ice and Wyona complimented him on his reading.

After the reading she checked on the understanding of the individual works: frigid and filigree. She repeated the sequence with the next verse, read by Michael.

W. - "What does six-sided star mean? This is your warning, D. What is the poem about?"

St. - An inaudible answer.

W. - "Good try. Vapor, what's vapor? What does it mean? Frozen flakes of vapor."

St. - "Ice on the ground with ice on top."

W. - "O.K."

St. - "It's tiny drops of water."

St. - "It's frozen rain from the sky."

W. - "O.K. you are all pretty close. Vapor is the stuff that is there before it turns into rain, or sleet, or snow. It's clouds really." The children raise their hands to answer. D. has pulled apart a tissue and laid it on his desk very gently.

W. - "What is a hedgerow?"

Without interrupting her sequence of questions or tone of voice, she walked toward D., "O.K., D., take a time-out." She then acknowledges R.'s response to her question.

* * *

"O.K. we went on a field trip on Friday. Where did we go? What did we do? (several respond) Use your hands, take turns, Dana?"

"We went to M.'s house."

"We went to M.'s house. (teacher repeated the response) How did we get there?" W. is recording the information on the blackboard.

"By car."

"By car. O.K. anything unusual about the trip there?"

"Yes."

"What was unusual?"

"We had lunch there?"

"O.K. we had lunch, what did we have for lunch?"

"Indian do-nuts."'

"What else did we have for lunch?"

"Dried fish."

"We had dried fish. What other kind of fish did we have? R., if you have something to say put up your hand please. We had dried fish and there was another kind of fish. Sit properly dear. What other kind of fish was there? Ah, dried fish and what was that called?"

"Fish eggs."

"Fish eggs. What kind of fish was it? (a pause) Do you remember? What those fish eggs were called? A special name. What was it called, M.?" (a pause)

"Herring eggs."

"Another special name for it. What was it? Not eggs but . . . (pause) Herring . . . roe. And what were the fish eggs on? It was wrapped around something."

"Spinach."

"It was not spinach. Use your head. . . . M.?"

"Scallop."

"Scallop. What is that called? Not scallop but kelp."

The discussion continues as W. draws the answers from the class and writes them on the blackboard. In the case of the smoked salmon she prompted them with sounds On one occasion one of the boys began to relate a story of his parents. When he finished, W. went back over the list of items on the blackboard. At one point D. is told to take a time-out.

* * *

These two vignettes illustrate three patterns that were evident in the classroom. The first pattern illustrated is the continual use of both positive and negative reinforcement. The use made of the chart is illustrated in the first example. The provision of the stickers was usually, as in the case of this example, tied to the timer. When it rang, some children were given a sticker; others were not. A curious aspect of this procedure was the fact that at no time during our observation of the classroom was the awarding of the stickers discussed. Nor did the children appear to react overtly to the awarding of them. Both illustrations show the use of verbal rewards and sanctions. Earlier, we made reference to the use of time-outs. The second illustration shows the student being sent to the back of the room and the first use of the threat. It did appear to all three of us that on occasions the children actually sought to be given a time-out. This was the observer's assessment in the second example.

Earlier an example was used to illustrate the use of repetition of student answers. Our assessment of this usage was that its purpose was reinforcement. In part this pattern is illustrated again in the second example.

What also emerged as a pattern was a fixation on a predetermined answer. This is quite well illustrated in the second example where the students appeared to be almost engaged in a guessing game, in answer to which they came close but not close enough to be correct. The word "clouds" appears to be the right answer; the student who offered "tiny drops of water" was only close.

We earlier discussed what was termed a detached clinical approach to teaching on Wyona's part. The second illustration shows this in the case of D. who is given a time-out in the middle of the lesson without much fanfare and the lesson simply continues. It was evident that behavior was more important than academic mark.

In summary, then, based on our observations during the baseline data collection period, classroom routines in Wyona's classroom were fairly well established. Her role was to maintain and reinforce student behavior within the set of routines that had been well established. Her stance was courteous, restrained, and quite dispassionate. The teaching consisted of a question and answer routine where the emphasis was upon a fairly specific response. The use of reinforcement was most noticeable. On many occasions it appeared that the emphasis on procedures and routines took precedence over the learning that was to occur.

Changes in Patterns.

When the patterns of teaching during the post-intervention period were compared with the baseline data, more similarities than differences were in evidence. The roles of the teacher and student remained essentially the same at least in any observable sense. Interactions between teacher and student remained constant. In terms of reinforcement and evaluation, they were similar to the extent that time-outs, verbal sanctions, and rewards, continued in essentially the same manner after the course as before. The general pattern of classroom organization and management into which these different aspects of Wyona's teaching were grounded remained intact.

One of the observed changes was a reduction in the use of stickers to reinforce certain types of behavior. Another change that appeared somewhat evident to the primary observer, although not evident in the transcriptions, was a more relaxed and less directive approach on Wyona's part as the year came to an end. This did not appear to be related in any way to the coursework model.

Wyona reported that as a consequence of the Educ. 406, she now spent more time reading to children. While she had read to children before, she now felt more comfortable in spending time at this activity. We did not observe this change as it occurred at a time of day other than our observation periods.

CASE STUDY: Laura Vernon

Teacher's Professional Background

Laura Vernon has been teaching in elementary schools for 15 years. She wriginally did a three and one-half year initial teacher training program at Simon Fraser University and then finished her fourth year of a five year program in 1984. She has a leave from her school district for the 1985-1986 academic year to complete her Bachelor of General Studies Degree.

She has always been oriented to helping young children, including those in kindergarten, learn academic skills. She believes that it is important to prepare kindergarten children for grade one through stressing the alphabet, pre-reading activities like "big books", and basic math skills.

Context for Participation in the Research Project

Laura was enthusiastic about the problem-focused course and was amenable to being part of the research project associated with it. She felt that the course was very appropriate to her needs because she had often attempted to introduce new ideas into her classes and, when they worked well, had written about them or shared them orally with her fellow kindergarten teachers. For example, early in 1985 she was helping kindergarten children work with computer terminals despite not having had enough in-service help to guide her. She intended to share her experience with other kindergarten teachers in the district. Thus, she is oriented toward research in the classroom and has reflected on her teaching in the past.

She was particularly interested in the problem-focused course because she wanted to work out a way to reconcile a new curriculum with her philosophy and methods. The new district kindergarten curriculum has very little in the way of direct teaching, a method she's accustomed to and prefers. She criticized this curriculum because it has no academic outcomes but also recognizes that, if it is taught "right", it has potential for developing independent learners. She volunteered for the research project because she is oriented toward classroom research and because she felt the discussions about her classes would supplement the feedback she would be getting from the Faculty Associate in the problem-focused course.

Karsten Elementary is a medium-sized elementary school in a large suburban school district. It has three kindergarten classes, 2 French and 1 English (Laura's), all meeting for one-half day. District resource teachers in different subject areas work with the children and the teacher. Equipment is shared among elementary schools. For example, gymnastic equipment and a bank of microcomputers were in the school for about six weeks before being moved elsewhere in the district. The principal is supportive of research in the classroom, of university involvement in schools, and of an academic approach to kindergarten, the last an important reason why Laura chose to work in his school.

Class Context

Laura described the kindergarten of 20 children class as average, with the children at different levels of achievement, motivation, maturity, and readiness. A few children can read, but most are just learning their letters and all are being socialized to the school world. Three December-born boys appear noticeably less mature than the others and are often slow in finishing tasks. A few children have home problems that appear to be reflected in their classroom behaviour. The mother of one child abandoned her family, and his speech development and relationships with other people appear to be affected. Another boy weeps with little apparent cause on days when his father leaves for extended business trips.

Two children with Down's Syndrome were "mainstreamed" in Laura's class as an experiment, and an aide was supplied by the district to work with the special children and to help with the regular classroom activities. The Down's Syndrome children have fit in well with the class, and the other children do not appear to object to working or playing with them. Their success in integrating with the other kindergarten children has led to their being placed in regular schools for next year. One will go into a regular first grade class but have one-to-one instruction in language arts and math in a skill development class. The other will go into a multigrade special class in another elementary school. Laura was very much involved with these decisions made by the school and parents about the future of the children.

The classroom is organized around centres for the children: a computer terminal, a sandbox, easels for art work, and a covered structure which can serve as a house, a store, or, as it was for some time this year, a pet hospital. Children's art work is posted on the walls and hangs from the ceiling. Large alphabet pictures surround the room above the chalk and bulletin boards.

Patterns Observed in Baseline Date

Role of the Teacher. Laura is a leader both inside and outside the classroom. In the classroom she organizes her aide, parent volunteers, older student helpers, and the children. She is energetic and efficient, structuring the lessons to accommodate her own philosophy of teaching, the district curricula, and the particular children in her class. She is the centre of the classroom activity when she is instructing or leading games or songs, but she has also taught the children to work quite well on their own, in groups, or under the supervision of older students or the aide. Laura also tutors individuals or groups.

Laura often takes on the role of curriculum developer. When microcomputers were provided to her school but no help given in using them with kindergarten children, she took one home over the Christmas holidays and developed some activities she could use with her class that did not rely on packaged games or lessons. When she read an article about kindergarten children's being able to write stories using their own orthographic systems and then reading them back to parents and teachers, she instituted such a program in her classroom. She also saw her role as explaining what is going on in kindergarten to parents through a bi-weekly newsletter. She explained the writing activities through the newsletter and later asked one girl if she had told her mother she was going to write. The girl said, "Yes, and she didn't believe me." Laura said, "She will, now!"

Laura's leadership outside the classroom takes several forms. She was chosen by her district to be the first kindergarten teacher to integrate special needs children into the regular classroom. She team-teaches some subjects, such as physical education, with the other morning kindergarten teacher, and she is active in the district kindergarten teacher's group. She helps parents of pre-school children determine whether their children are mature enough for kindergarten and occasionally makes recommendations that parents postpone enrolling their children in school. Usually her advice is accepted.

Planning. Laura does extensive long-term and short-term planning. She organizes the whole year's activities in terms of where she wants the children to be by June. She writes a complete daily list of activities in her plan book, and all materials -- big books, tapes, art supplies, activities in centres, tangible items for children to manipulate -- are prepared before the lessons. She has anticipated responses in mind and probes until she gets them or structures the situation so that the children will see what she wants them to learn. For example, through questioning and helping them recall uses of audio tapes in class, she led the children to say that microphones can both pick up voice sounds to amplify them and also to store them on tape. On another occasion she used a combination of phonetics (the sounding out of the "gr" in "grouchy") and meaning ("How would you describe someone who is angry?") to help children read the title of "The Grouchy Ladybug". In general she plans how she will structure the lessons, make connections for the children, organize the sequence of questions, and lead and facilitate learning.

Interactions. The interactions between the teacher and the class are procedural, structural, instructional, and disciplinary. In the teacher/class presentations, Laura often repeats individual children's answers partly to reinforce them but also because they have very light voices that are difficult for their peers to hear. She gives instructions about procedures and asks questions to make sure they are understood. She tells children why they are doing things: "You'll need to know about 'equal' to do your math." "You'll be doing a lot of comparing later on." Her instructions include presenting, explaining, and demonstrating the use of materials and then asking various individuals to show her and the class they understand.

Occasionally she has a dialogue with a child in front of the class to straighten out problems, for example, when Joey and Mahina jostled each other over a book and when Robbie wouldn't give a book to Alyssa to put away. She felt that these situations needed handling immediately, but she also commented to the children that such public sorting out of disagreements between children was a waste of kindergarten time.

There are frequent interactions between the teacher and small groups or individuals. These serve as help, encouragement, and positive reinforcement. A bell is sometimes used as a signal to "freeze", and children stop whatever they are doing to listen to instructions. There is some child/child talk in the centres or when the children are working in groups or in pairs.

Role of the Student. Because the children are very young, they are just learning how to be students. Much of their behaviour results from Laura's expectations and training. Although she attempts to accommodate short attention spans with frequent changes of activity during the half-day session, the children are sometimes restless. However, they have learned the routines and work well alone or together on the tasks they are given. They show initiative in "show and tell" and in choosing songs or games to play at the end of the morning. They take turns being "special helper", a child who leads the morning exercises and is asked to hand out or collect materials on that particular day. They also each have a chance to draw a picture for the cover of the biweekly newsletter sent home to parents. They are not physically "clingy", but some need help with shoelaces or zippers or hair barrettes.

Evaluation. Evaluation in Laura's classroom, like planning, applies to both long and short-term goals. In preparing the children for grade one, Laura works toward helping them develop academic and social skills. She has frequent conferences with parents about the children's progress during the year. At the end of the year she is able to profile the children's development in math and language arts and in such school-related skills as working with others and alone, cleaning up, and using free time constructively.

In relation to shorter-term goals, Laura gives both the children and the parents specific evidence of the level of mastery of discrete skills the children are learning. When a child has done several activities with a letter of the alphabet and can print it in both upper and lower case, Laura sends a notice home to the parents with a sample of the child's printing. In whole group instruction, she checks to make sure children understand exactly what they are supposed to do before she gives them individual tasks. When she was teaching the concept of "equal" in math, she used interlocking blocks, giving each child a handful from a tub. Each child was then asked to lock the blocks together, count them, get an equal number from the tub, lock the second set together, and place the two columns of blocks side by side. Laura taught the children that they could count the blocks or measure the columns against one another to discover "equal". She could see easily whether or not each child in the circle had equal columns. When she discovered that one or two did not, she asked the children to count the blocks in each of their columns. The children quickly realized the numbers were not the same. Once she had assessed that all the children could both count and measure to find "equal", she set each child the task of finding names of children in the class that were equal, more than, or less than the number of letters in his or her own. Laura is thus very particular about assessing the children's levels of competence before she moves on to the next task.

Organization of the Class. Routines are well-established for classroom opening exercises, transitions, and clean-up. Laura presents new concepts with audio-visual aids and concrete materials, checks to see if the children understand, and then gives individual or pairs work for them to do to integrate the new understanding. She and the aide then monitor individuals' progress. If an activity extends over several days, she reviews the concept and the routines with the children each day, making sure they know what they are supposed to be doing. When children finish early, they select a book to look at or go to a centre. Specific times are established for art, music and games, "show and tell", physical education, library book reading, and centre activities.

Illustrative Example and Analysis

Unlike the other teachers in our study, Laura had begun to work on her project before she enrolled in the problem-focused course. She told us that she wished we could have observed her during the previous school year because she had already made some changes at the beginning of the year of the study. Therefore, the example which follows from the first set of observations illustrates Laura's teaching in the process of changing. It has some characteristics of both her previous teaching practices and the changes she wants to make in response to the new kindergarten curriculum and to her changing views of what kindergarten children can and should learn.

The first lesson we observed focused on the use of microcomputers which Laura had experimented with over the Christmas holidays. After Laura had introduced the children to the equipment, they worked individually at the terminals with the help of an aide and some sixth grade children. They were first asked to make their own patterns using two or three numbers or letters.

Although various games and lesson activities are available on software (including a math drill I later observed two children doing in the computer centre in the classroom), Laura wanted her children to be able to use their own initiative and creative abilities before they began to rely on already programmed software. This portion of the lesson represented a change in Laura's teaching style since she did not direct the children to learn specific patterns but instead allowed them to experiment with the keyboard.

After the children became familiar with the keyboards through pattern making, however, Laura directed them to search for alphabet letters in order (she put models on the chalkboard) and to try typing their names. This part of the lesson reflected her previous teaching practice in its focus on academic goals.

The two parts of this lesson reflect both Laura's previous teaching practice and her attempts to integrate the new kindergarten curriculum with her more direct teaching style. She had planned and organized both parts of the lesson, and she had goals for it which were both explained explicitly to me and also easy to derive from my observation of the class. The focus on the alphabet on this lesson reflects Laura's academic goals for the children, but the emphasis on their developing their own patterns and exploring the keyboard reflects indirectly the less-structured, less academically oriented thrust of the new curriculum. Thus, the microcomputer lesson just described showed some aspects of Laura's old and new styles of teaching.

Changes Observed in Patterns

As the result of the new kindergarten curriculum, Laura had initiated changes in her teaching several months before the problem-focused course began. These changes became the substance of her projects for the course. Her major project involved the integration of the new kindergarten curriculum with her own concerns that kindergarten children learn academic skills. A second project initiated themes as the focus for all subjects.

Because we had not observed her teaching prior to her initiation of the changes, Laura explained to us how she previously taught the alphabet.

Formerly, she led the children letter-by-letter through the alphabet, making sure that each child knew how to sound and print each letter before the whole class moved on to the next. This process took so much time the class did not often reach "z" by June. This year, however, she divided the alphabet into sets of six letters and allowed the children to work on the letters individually.

For every letter, a plastic tub contained various activities for the children to work through in any order. The activities included tracing the letter in the air and with fingers on paper, cutting out and pasting the letter, putting glue on the drawing of the letter and sticking small items on it, such as beans for "B" and glitter for "G", making a stencil of the letter, doing a rubbing of the letter, drawing or colouring pictures of things that begin with the letter, etc. Children could work at their own speed, and if they did not finish all the letters in the set before it was time for the class to move on, that was all right. For each letter they did complete the activities for, however, they got a certificate to take home to announce that fact to their parents.

In previous years, Laura said, the children generally learned to print the letters more neatly when she was guiding them letter-by-letter through the alphabet. However, she noted the several advantages of the new method. Because the children had a choice of which letter to work on and in what order to do the activities, they became actively involved with their letters. They created their own groups when working on the same letter: "I'm working on 'M'. Who else is working on 'M'?" They noticed the letters in stories more frequently and volunteered that words they saw or heard began with the letters they'd learned. Slower students were not pressured to keep up with the class and could concentrate on learning a few letters well rather than all letters scantily, and faster students could be given enrichment activities if they completed all six letters in a set before the class moved on.

Another change related to the new curriculum involved a focus on some thinking skills that could be applicable to many school subjects as well as out-of-school activities. One of them, classification, both as a concept and as a skill, is part of the "Math Their Way" program and of the new curriculum. Laura organized tubs of items, like bottle caps, rocks, tags, buttons, and spools, which children could practise classifying by colour, shape, size, kind, or other ways of categorizing that they could come up with. Peter, for example, discovered that he could classify seeds by whether or not they made any noise when shaken. Laura also took the concept of classification into math lessons, the children's own hobby collections, and the new thematic units.

Laura's second project, the thematic units, involved activities on a certain theme or topic; one which could pervade all subject areas. This year one such unit was based on cats. The children did various activities related to cats: reading stories, examining and drawing pictures, going on a field trip to a veterinarian's office, organizing a pet hospital as a classroom centre, having visitors bring cats to school, and talking and writing about pet cats. Later the class did a similar unit on teddy bears. For both thematic units Laura had prepared various levels of enrichment activities for the classroom centres.

Despite the changes in types of instruction, the routines and careful structuring of the classes remain as before, and Laura's questioning of the children to make sure they understand has not changed. There is, however, more room for child choice, more accommodation of different learning speeds, an atmosphere more conducive to child initiative, and more opportunity for children to integrate new knowledge rather than just learn it.

Discussion

Laura feels that the changes she has made have more advantages than disadvantages. She will continue to use the individualized alphabet approach but she will start it at the beginning of the year and pre-test the children to find out how much they already know about the alphabet. Since some children know the alphabet before they enter kindergarten, this new approach will allow Laura to get them started on enrichment activities earlier in the year.

She will also continue to use themes, but the careful observation by the Faculty Associate has suggested to her that it may not be worthwhile to develop so many enrichment activities for the centres since few were used.

She stressed that the problem-focused course had made her "really look carefully at the kinds of changes" she was making. The course also made her focus on her objectives and question herself about whether or not activities she planned for her classes would help the children achieve the objectives she had set for them. As she evaluated children's drawings, for example, she would ask herself, "Am I really meeting my objectives for art, or is their art work just 'nice'?" Particularly with the thematic units she wanted to move toward integration of subject areas in the classroom.

On a broader basis Laura had to confront some philosophical questions about her teaching. The problem-focused course helped her realized that what she does in her classroom must be consistent with her own beliefs about education. As a result of her experience with the course and her reflections about it, she has become more critical of in-service education and has begun to understand some of the complexities involved in changing teaching.

On reflection she realized that her discovery that new teaching ideas must be consistent with a teacher's own philosophy reinforced her previous experience with in-service workshops. Not every teaching idea, no matter how exciting it seems at first, can work for every teacher in every teaching situation. Having perceived this principle, Laura commented, "I will never approach change the same way again. I will look at change more scientifically and not assume that just because the teaching idea is in vogue that it will be appropriate for me or for my class."

Laura says she will continue to work to accommodate the new kindergarten curriculum and to change her teaching to make it work better for her classes and for herself.

Laura's Comment

As I read about myself, I felt I had been perceived as an extremely traditional authoritarian, with the children as robots springing to attention. I realize that I'm a highly structured person in terms of the kinds of skills I'd like to see the children attain. I also realize the program I run is structured. However, I have always thought the physical set-up and activities within my centres were consciously organized to allow freedom, interaction, and open-ended development. In two and one-half hours a day there are so many subject areas to cover and development areas to consider I suppose I do look like a very regimented type.

I am not on the defensive here! I suppose it's how I see myself and how someone else sees me. You are not inaccurate in your observation. I commend your insights and wish, for example, the reports that have been made by principals on me were as accurate and comprehensive as this one.

Changes in Teaching Regularities

In the case studies we outlined the differences noted in individual cases and have listed these for all teachers under the cluster headings on Table 3. What follows is a summary of differences evident to some degree across the group.

Changes in the teachers' role were characterized by a loosening of teacher control over choices of activities and over outcomes of discussions. The teachers talked about being facilitators and about using open-ended questions. They aimed to encourage what they understood as self-directed learning in their students which they saw as improving the quality of the learning. In their practice, they allowed students to choose activities within a topic or skill framework, and avoided declaring student answers right or wrong during discussions. Instead they responded with clarifying questions or non-judgmental, accepting comments which would indicate their listening attitude, and their interest in learning from and with the students.

Lesson planning was affected by these changes. The teachers allowed more time on topics and more flexible scheduling; a few concentrated on the framework for the learning rather than on the content to be taught. The planning provided for an altered student role, and for different patterns of interaction. In most cases content-based student-to-student talk increased, mainly when students were working in small groups, but also during large group discussions where the teacher drew attention to what individual children said and asked for response. There was more of a sense in these cases of the class having a conversation about the subject rather than participating in a teacher-led question-answer quiz session.

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TABLE 3: CHANGES IN TEACHING PATTERNS

Research Participant	Role of Teacher	Planning	Role of Student	Interactions	Evaluation	View of Subject	Organization	Other
Patricia Clark	Accepted self as learner in science rather than source of information. Attempted role of facilitator of activity and discussion.	Provided materials and structure for the class; not the information to be learned. Precise outcomes not specified. Learned through talk with each other and collaborating on tasks.	Worked as leaders, recorders, and reporters in groups. Initiated experiments and ideas for the class.	Increased student-student sharing. Less testing and more clarifying of knowledge and understanding.	Increased concern with level of thinking required to answer questions. Decreased emphasis on 'right answers'.	Science allows individual thinking and observation which may lead to divergent conclusions or outcomes. Science is a vehicle for thinking skills rather than information to be learned.	Reorganized class to accommodate experiments with acutal materials.	Limited understanding of scientific concepts and processes. Techniques acquired for particular contexts/ topics, rather than principles.
Martin Davis	Asked fewer 'testing' questions during teacher-led discussions. Reduced number of directions about procedures Became more of learner with students; adopted a more inquiring stance about content to be learned.,	Allowed increased time for each topic, guided by student interest and attention. Students made suggestions for activities; contributed ideas. 'Real' materials used for experiments in science.	Students learned from each other by working with materials in groups. Talked about materials and topics by themselves. Raised questions about topics being studied.	Increased peer interaction on topics being studied. Teacher encouraged elaboration on answers during discussions.	Evaluation of student performance not being used as a primary teaching strategy or stimulus.	Less specified information for students to learn. Science skills are practiced in the context of science activities. More time for student exploration of the topic.	Use of review at beginning of class to set context and tone. Explicit connections made between science lessons.	Observed changes were encouraged by the coursework and mentoring but did not appear to be processed and integrated into teacher's understanding.
Tara Dobol	Relinquished responsibility for some of student activity in art.	Developed contract system in art to individualize learning.	Involved in planning individual units and choosing topics in art.	No observed change.	Based on completion of contract as well as quality and progress.	No observed or described change.	No observed change.	Planning the unit was time-consuming. Benefits may be insufficient to motivate the development of similar units on other topics.
Deborah Marshall	Took cues from students in discussion and listened more attentively to their meaning. Clarified with comments and questions rather than evaluated. Acted as facilitator rather than director, adopting an inquiring, tentative stance.	None observed	Increased student talk and sharing about subject matter.	More student-student interaction. Teacher listened and commented rather than evaluated.	No observed change	More interested in students learning and thinking than in transmitting. Allowed unexpected outcomes. Looked for transfer of thinking skills taught directly to use in content areas.	No observed change.	Will continue to experiment and to increase repertoire of teaching techniques. Some reflection on teaching, but main emphasis on technique.
Barbara Mills	Increased listening and facilitating in small groups. Reduced amount of teacher-led whole class discussion. Set up situations for content-based student talk. Became more neutral in handling student answers, did not indicate directly whether an answer was right or wrong.	Provided students with more choices of materials and activities. Monitored individual performance through conferences and use of notebooks as alternative to checks during whole group interaction. Established learning situations in which specific processes and outcomes were not prescribed. Students encouraged to pursue given tasks in own way and to own ends.	Engaged in more independent, self-initiated talk. Elaborated on the topics or ideas they shared among peers, in partners or small groups. Chose particular activities within a given range in order to make own discoveries about the subject matter.	Increased student-student interaction. Reduced direct feedback to students by teacher.	Fewer evaluative comments.	Saw student talk as contributing to learning subject matter, rather than as a discipline problem.	Increased small group time and work. Reduced teacher-led review and closing.	Needs support and motivation to change Aware of risk-taking involved Will continue to experiment Recognizes extent of her control and that she may exercise it in different ways.
Wyona Sewell	Seemed slightly more relaxed at end of year	None observed	None observed	None observed	Reduced use of stickers.	Increased reading aloud to the class viewed as positive.	Allowed more time for oral reading to class.	Minimal intervention or help offered through the coursework. School norms perceived as constraints. Problem identified required minimum risk and behaviour change.
Laura Vernon	No observed changes	Allowed for more flexible scheduling of individual activities.	Chose individual activities within given set. Proceeded more at own speed. Had more opportunity to initiate topics to be learned.	Increased on-task student-student interaction.	No observed change.	Moved toward interrelatedness of subject matter through thinking skills. Used themes to govern choice of topics and activities in Language Arts.	More opportunity for individualizing tasks.	Students recognized as being more capable than the teacher had realized. Changes due both to the coursework and to the new curriculum directives.

That kind of interaction appeared to encourage students to talk openly and at greater length than previously. This was particularly the case in the small groups where rephrasing and redundancy were not discouraged and each child had an opportunity to express his understanding in his own words, and to share ideas. Students, allowed more choice, also made more suggestions and contributed ideas about future lessons, and about their own work, all of which the teachers interpreted as indicating that the students were taking more responsibility for their own learning.

In many cases, the differences observed were accompanied by shifts in teachers' views of their subject. Where teachers had felt dissatisfied with their teaching, particularly in science, the changes made their practice more consistent with their attitude toward the subject. Science teaching focused on skills and processes rather than on content. Teachers who accepted the inquiring nature of the scientific process and the tentativeness of any scientific conclusions provided materials, time, and open-ended discussion rather than deciding on particular concepts to be learned and teaching them. In other curriculum areas, teachers reduced their control of activities. They allowed students to make choices that would enhance students' participation in and awareness of the subject matter.

In general, the changes were similar in direction across the group. All teachers moved toward relinquishing some degree of control or authority in order to stimulate student involvement in the learning. These changes or shifts were accompanied by different degrees of discomfort and understanding on the part of the teacher and different levels of successful response on the part of students. The significance of the changes and the implications are discussed in the final section.

Results from Interviews and Questionnaires

Introduction

Although the major data for this research project came from observation and interviews with the teachers enrolled in the problem-focused course (one version of Education 406) we also gathered data from some adjunct sources: some related directly to the research project teachers, and some related to in-service education in general. These sources included the Faculty Associate, Steve Olliver, who assisted in the teaching of the problem-focused seminar, observed the project teachers in the classrooms, and helped them implement their problem solutions. A second source was five teachers enrolled in another version of Education 406. These teachers agreed to be interviewed about their reactions to the course, and they answered the same questions asked of the teachers who completed the problem-focused course. In addition, 70 teachers enrolled in extra-sessional education courses completed a questionnaire about in-service education during the last week of their fall term courses.

Interview with the Faculty Associate

Steve Olliver, the Faculty Associate assigned to Education 406, the problem-focused seminar, is a high school science teacher seconded from his school district to work in pre-service and in-service education at Simon Fraser University. He had already had experience with pre-service teacher education before his assignment to work with the teachers in Education 406, and he commented that his prior experience was vital to him in his development of strategies for working with the in-service teachers. He worked with seven teachers, five of whom were subjects of the research study.

The research team did not discuss Steve's work with the project teachers until after Education 406 was completed because we wanted to maintain a neutral distance from the problems the teachers had identified. In contrast, Steve was directly involved with all aspects of the problem-focused seminar. He helped teachers identify and limit the problems they wanted to work on. He helped them plan solutions. He observed the teachers as they implemented these solutions in their classrooms, giving them feedback and non-evaluative help. He was their mentor and coach. We see a mentor as a person who in himself is a source of ideas and inspiration whereas a coach is someone who teaches specific techniques (Joyce & Showers, 1980).

In our interview with Steve, we asked a series of questions about what he did and about his perceptions of the teachers, of teacher change, and of in-service education in general. A copy of the interview protocol is included in the appendix.

We first asked Steve what problems the five teachers whom he observed and who were in our research project had identified. We did this as a check against our understandings of these problems as expressed by the teachers in their final interviews with us. Fortunately, our understandings were the same (see Table 1).

We then asked Steve how he had assisted each teacher. He had visited the teachers between six and eight times each, with the length of the visit ranging from one to two hours, including talking with them before and/or after each visit. The quotations which follow were taken from the interview with Steve, conducted on August 27, 1985.

> In most cases I gave them feedback and encouragement. I helped them clarify their thinking. Sometimes I did it through leading questions, the way I do it with student teachers.

> I coached a lot. That is, I gave some ideas: "You can do this, you can do that. Why don't you read this? It'll give you a better understanding." With a lot of them I had to give them a lot of encouragement. It was strange for them to be doing something that they didn't have much confidence in. And I had a feeling that with some of them, if I didn't go in and start saying something positive about the change, that they were ready to give up....They were doing something totally new, and when you're doing something new, you're going to make mistakes.

He continued with details of what he did for each teacher:

> With Patricia, I think my major role was providing ideas and clarifying what she was doing. She might have students working on a particular thing with a certain goal in mind, and I would ask questions to find out if what the kids were doing would really help them in reaching the goal. We focused on her language quite a lot. I spent a lot of time writing down what she said.
>
> Tara was one of the most difficult because it came to the point when....(I had to tell her) I have certain expectations. "You're going to have to meet certain criteria before I can say you've done five credits worth of work." Tara was one of those people (who) reached a point that time passed and time passed, and she was sort of getting into it, establishing baselines etc., and I was observing her classes, and she finally decided she was going to develop this contract booklet, and have it finished by the end, but she might not have a chance to implement it. So I put a little pressure on her, telling her that part of 406 was implementation in the classroom, and "I know that's not going to be easy, but I think you should start it to see if some progress can be made, see if it starts working by the time 406 is over." So I think she spent one hell of a weekend getting those contracts together, but she did do it, and she did have the students working on it.
>
> With Barbara, she seemed very confident....and what I did, really, was provide her with a lot of positive feedback, particularly at first, because I'm a science teacher myself. To see somebody doing this with grade 1 was really great. Then she started to wonder about how much time was being spent and whether kids were making any progress; and she started asking questions like, "Well, is it okay if I do this sometimes, and back off, and sometimes tell them things?" And then I had to give her positive feedback that, "You don't have to be open-ended all the time; there are times

> for bringing the class back," even to the point of suggesting ways she could do that instead of going around and telling every kid this and every kid that. Bring the kids back and have a discussion and see if it comes from the group.
>
> Of all the people that I worked with, I felt that he (Martin) came the longest way....the description of what he did in science was pretty shallow....By the time he finished....he found that science was the most interesting subject for them (the students); they liked it more; they said more positive things about it. They had their own choice working on the projects, competing with each other. It was all pretty simple stuff, but for those kids it was challenging, making an ice cube, trying to see how long they could keep the ice cube from melting or see who can make an ice cube melt the fastest. It was really something to see....I was really quite pleased.
>
> With Laura, the main thing I did was provide feedback. When I went into her class I usually would focus on a particular student to see if the kids were doing what they were supposed to be doing and if they were going for help or working independently. We picked four students; she picked two, one she figured was a higher level and one who was a slower learner, and I picked two sort of at random because I didn't know the kids.

Steve's comments about the importance of encouraging the teachers echo to those of Christopher Day (1981). Although teachers often want information or answers to questions they have about what they are doing, they also need affective support from the coach or mentor. Steve also recommended whether teachers would pass or fail the course. He noted the contradictions in this dual role in the interview:

> I had a conflict between being an evaluator and a facilitator, similar to the conflict you have when you're working with student teachers, in that you spend so much time with them trying to be a facilitator and you know and they know that the judgmental part of it has to come in sooner or later. It's difficult trying to separate those two.

He also suggested what background might be helpful for someone who had to play such a dual role:

> I think having had the background as a Faculty Associate was really important because I knew how to collect information, how to be non-threatening. I think all the people found me non-threatening. Patricia was the one who talked to me about it, who still felt uncomfortable about it. She just wasn't used to people coming into her classroom to observe.

We asked Steve to comment on the strengths and weaknesses of ED 406. He mentioned that the small number of teachers in the class made timetabling of visits easy. He could visit the teachers when they wanted him to. He felt one weakness was that:

> There was such a diversity of goals. In the seminars I conducted our objective was to do group problem-solving, sharing of ideas; and a lot of them didn't really feel that that was useful. They felt that their problem was so unique, that they didn't want to spend time working on somebody else's. They felt the time with me alone was more valuable. And I was disappointed by that. The times that I did it I thought were successful, but they just didn't want to do it as often as I thought would be valuable.

It is clear that the teachers very much appreciated Steve's help, and they wanted him to devote time to their problems. They were less interested in discussing problem-solving in general. They did not express concern about his dual role as facilitator and evaluator, although one teacher, Patricia, never was able to relax while Steve was observing her class.

Because Steve had been involved intimately with the problem-focused coursework model, we wanted to know what he thought of the whole experience. He had reflected on his experience, and he had come to some conclusions about his role and about the process of teacher change.

> I think the most important thing I've learned is that people can make changes. If they're committed to making the change, they can make it. I don't know whether they'll be long lasting or not because I know that I put on a certain amount of pressure. I don't know whether they were doing it for me or for themselves. I suspect they were doing it for themselves, but I think I found that they can make those changes more readily if they've got someone to help them do it.

> I think it would help if we had a group of teachers in one school who were committed to making a change; then they would get a lot more feedback, a lot more problem-solving. Or, if we took a group of people from the same subject area, such as science, that is as a sort of follow-up to a course.

After his experience with the problem-focused course, Steve summarized the three factors he felt were necessary for teachers to accomplish in-service changes they want to make: 1) Teachers need to link research and theory; 2) Teachers need to understand what they do; 3) Teachers need practice. "These three things must come together in some way."

Interviews with Teachers Enrolled in the "Professional In-service Practicum"

Education 406 at Simon Fraser University had three sections in 1985. One, the Professional In-service Practicum, included lectures at Simon Fraser on thinking skills and the whole language approach to language arts as well as practice and feedback in the schools. The Simon Fraser instructor gave feedback through detailed responses to teachers' journals and to their explanations and recording of what they were doing in their classrooms. In addition, an advisor or sponsor in the district or in the school observed them in the classroom, helped them with their implementation of changes in their practice, and talked with them informally about what they were doing. The amount of help each teacher obtained varied considerably since many of the school or district advisors were very busy with other responsibilities or were themselves classroom teachers who could not get away from their classrooms often to observe or discuss the other teacher's project.

By interviewing 5 of the 30 teachers enrolled in the Professional In-service Practicum, we hoped to be able to compare their responses to the version of Education 406 in which they were enrolled with the responses of the research project teachers to the problem-focused seminar. We used the same interview protocol when we interviewed the 7 research project teachers after they had completed the problem-focused course. (See the appendix for a copy of the questions.)

Even though many of the 5 teachers had taken a course in the teaching of Language Arts in the fall term before they enrolled in the Professional In-service Practicum, their particular classroom projects were varied from work on thinking skills to the development of an integrated unit on China. (See Table 7 for a list of the projects of the 5 teachers.) There were also differences in the types of changes, in the desirability of the changes, and in the type and extent of support. Details of this information are also listed in Table 4.

The 5 teachers also answered questions about how their involvement with the Professional In-service Practicum had affected their attitudes about professional development. One teacher (M.A.) commented about this version of Education 406:

> What is nice about this is that it was on-going, for the full time, and we could implement it in our classrooms. We were learning about it. So we had the situation, and we had the children, and we could try things out. Also, it was very convenient because we met as a group every Thursday, but we met here at the school, so it didn't involve a special trip to SFU.

She commented in addition how this type of course differed from the regular university coursework:

> So often, I think, you forget bits of it, like when you are taking a course, you are so involved with the course itself and getting the work done that you are waiting until you complete it and then you try and bring it into the classroom.

Another teacher (B.N.) compared this course with in-service workshops saying that although the workshops were useful, they did not change her way of teaching the way this course did. She ended her remarks saying, "It's the best thing that's happened to me since I've started teaching."

Table 4

Interviews with Teachers in Another Version of Education 406

Teacher	Project	Changes	Desirability of Changes	Support
M.A. (K)	Teaching for Thinking	Techniques of questioning and responding to children	They help children become more independent	Large group of teachers and an advisor in the school. Principal supportive, too.
S.K. (K)	Fostering emergent reading; using whole language approach	Children learned to read from doing children's printing, reading it to an adult, and having the adult put the "grown-up" writing on it.	They "make sense" in terms of the reading and reflection the teacher has done	Another teacher in the school and the university instructor
B.N. (Gr. 2)	Language Arts	Children learned the spelling words they actually need; they wrote to show their reading comprehension, they read more novels, fewer readers.	Written answers to comprehension questions help the teacher understand the child's level of reading.	Sharing with other teachers and her supervisor
S.P. (Gr. 4)	Implementation of "Write Away"	Individualizing writing through writing conferences	Children do much more writing and at their own speed. Competition is diminished. Opportunity for more creativity and more complex skills.	Although talking with other teachers and her sponsor helped, it was not really necessary. Her main support was her personal journal reflecting on each lesson.
S.S. (Gr. 3,4,5)	Development of an integrated unit on China in connection to celebrating Chinese New Year	Individualizing reading and writing.	New program corresponds to the teacher's philosophy; children participated in evaluation. Children learned to be responsible for themselves.	Important support from instructor; he and S. agreed philosophically. Sharing with other teachers, "networking".

S.P. said that the 406 had not affected her views of professional development. She said she "likes courses, workshops, and will continue to take them." She prefers directed studies like 406 in which she "creates, plans, implements and evaluates" her own program. S.K. especially liked the experience of taking a course with other people. She had been taking correspondence courses prior to this one. She also particularly liked the kind, supportive, and non-threatening approach of the university instructor. The fifth teacher, S.S., was particularly supportive of the approach of the Professional In-service Practicum:

> Nobody said, "This is the assignment; go do it." You were asked to find out what you needed, what was relevant to you.

These remarks are similar to those made by the research project teachers who took the problem-focused seminar. The teachers in both versions of Education 406 were appreciative of the opportunity to work on projects which were relevant to their classes and to their styles of teaching. They liked having non-evaluative feedback and the chance to discuss what they were doing with other educators. In addition, some teachers in both versions of Education 406 volunteered information that the courses gave them an impetus to reflect on their teaching and judge techniques and ideas on the basis of how well they fit in with their beliefs about teaching and their philosophies of education.

Questionnaire

Before the problem-focused course began, we administered a questionnaire to 70 students taking four evening courses in the fall term of 1984. These courses were all in education, in the "designs for learning" or curriculum and instruction areas. One was in the teaching of science, one in the teaching of math, one in the teaching of music, and one in learning disabilities.

The questionnaire asked for several types of information. We first wished to identify the professional status of the students who were enrolled in the courses. We also wanted to find out what teachers say they expect from university coursework and whether or not they have been gaining what they want from such coursework. In addition, we asked them to rate various types of in-service education activities with which they have had some experience. A copy of the questionnaire is included in the appendix.

The results of the two sections of the questionnaire follow. The first part lists in a table the types of students who were enrolled in the four courses in the fall term of 1984. (See Table 5) The second part of this report summarizes the results from only those respondents who have completed initial teacher training and are thus qualified to teach. This initial training may have been completed at Simon Fraser University or at another institution. These qualified teachers number 39 from a total of 70 who completed the questionnaire. (See Table 5: In question 1, qualified teachers are those included in sub-questions 3-6.) A little more than half (24) of these qualified teachers were employed as teachers when they completed the questionnaire. The responses of the students who have not yet completed their pre-service training are not included because our focus was on in-service education.

With the exception of question 6, the questions in Part II were open-ended. To summarize the responses, we listed them all and then looked for ways to categorize the types of answers. Identical or similar answers were counted and grouped under three main headings for questions 1 and 2 and under other appropriate headings for questions 3-5. Examples of the exact wording of a sampling of the responses are included as well as an interpretive comment to frame the results. (See tables 6-10).

Table 5

Questionnaire Results, Part I

I. Which of the following describes your status as a student right now?

1.	Preparing for PDP*	17
2.	Currently in PDP*	5
3.	Completed PDP, but not currently teaching	11
4.	A practising teacher who completed PDP*	11
5.	Completed teaching preparation at another institution but am not currently teaching	4
6.	A practising teacher who completed teaching preparation at an institution other than SFU	13
7.	From outside the teaching profession	1
8.	Other	8
	Total	70

II Please provide us with information concerning your purpose for taking this course:

a) As preparation for the completion of an Education MINOR?

1. Learning Disabilities	13
2. Environmental Education	2
3. General Education Minor	4
4. Physical Education	0
5. Early Childhood Education	8
6. Education Studies	5
Sub Total	32

b) As part of a Bachelor of Education program, but not toward a minor?	13

c) As part of one of the following programs?

1. Bachelor of Arts	5
2. Bachelor of Science	1
3. Bachelor of General Studies	19
4. Post-baccalaureate, 1 year program	10
5. Other	3
	38

d) For general interest	17
e) For upgrading and/or change in teaching specialty?	24
Total	124

Comment: It is likely that as many as 54 students indicated more than one purpose for taking the course.

*PDP Professional Development Program, a one year program leading to teacher certification.

Table 6

Questionnaire Results*, Part II (Question 1)

What do you expect to gain from university coursework?

Interpretive Comment: The table shows that a large number of teachers expressed the desire for specific skills, techniques, and ideas for the classroom. However, more than a quarter also mentioned wanting theory and background understanding as well as personal rewards: both specific, like degree completion, and more general, like insight or incentive.

Answers	Number	Percent	(N=41)
A. Understanding and knowledge The written comments in this category suggested a desire to broaden perspectives about teaching and understanding students as well as obtain specific knowledge of curriculum and areas such as special education. examples: "to gain a broader range of material to choose from and work with" "to understand theory to back up reasons for doing things in the classroom"	11	26%	
B. Skills and techniques Teachers wanted new, practical ideas to take to the classroom as well as techniques to meet the needs of students. examples: "to improve the skills in the classroom in order to become a more effective teacher" "to gain new methods, techniques to improve classroom teaching"	18	44%	
C. Personal rewards i) Teachers wanted to complete academic requirements, upgrade certification, or change areas of specialization. ii) They also wanted to get motivation from interaction with colleagues and faculty of education instructors. examples: "to upgrade qualifications in the subject" "to gain motivation and incentive to try new ideas" "to gain reassurance that what I'm doing is right"	12	29%	

*Results for the 39 respondents who had completed pre-service training. Some teachers wrote more than one response.

Table 7

Questionnaire Results,* Part II (Question 2)

What do you gain from university coursework?

Interpretive Comment: Here there appears to have been a shift from the responses to question 1, what teachers expected from university coursework. Instead of mentioning skills and techniques most often, teachers said they gained more in the areas of general understanding and knowledge and in personal rewards. It also appears that teachers were more inclined to list what they gained as compared with what they expected to gain. There were more responses in total.

	Answers	Number	Percent	(N=49)
A.	Understanding and knowledge Teachers gained background knowledge and understanding as well as exposure to new curricula and specific knowledge about subject areas like special education. examples: "the information gained will be helpful in the teaching of learning disabled children" "I learned about current research findings and trends"	17	35%	
B.	Skills and techniques Teachers gained skills in teaching in general as well as in changing techniques and developing materials and methods for teaching new curricula. examples: "I got ideas to make the class interesting" "I gained know-how for teaching students with problems" "It helped me change teaching strategies.	14	29%	
C.	Personal rewards Teachers gained credits for degrees and for extra pay as well as satisfaction, confidence, reassurance, and collegiality. examples: "I gained self-confidence in educational matters, both for discussion and for the classroom" "I got a shot in the arm" "I got an extended studies diploma"	18	37%	

*Results for respondents who had completed pre-service training. Some teachers wrote more than one response.

Table 8

Questionnaire Results*, Part II (Question 3)

What were the qualities of the best education course you've ever taken?

Interpretive Comment: Responses focused particularly on the content of the courses with less concern for the organization or the instructor.

	Answers	Number	Percent	(N=40)
A.	Personal qualities of the instructor Teachers appreciated vivacity, stimulation and imagination to motivate and challenge, and ability to teach, including good preparation.	8	20%	
B.	Organizational qualities of the course Teachers appreciated having clearly stated objectives, well-structured lectures, and "hands-on" experiences.	10	25%	
C.	Content of course Teachers appreciated practical ideas (15/22) as well as interesting material, meaningful assignments, theory related to practice, and a multitude of ideas which can be developed and expanded.	22	55%	

*Results for respondents who had completed pre-service teaching.

Table 9

Questionnaire Results,* Part II (Question 4)

Do you think coursework in education could be improved? What suggestions do you have for such changes?

Interpretive Comment: The results of this questionnaire seem to support the consistently expressed view that teachers want practical ideas for the classroom.

Answers	Number	Percent	(N=72)
A. Less theory, more practical teaching suggestions tying in with the classroom Teachers were very strong on this point with several mentioning that theory was irrelevant and that "designs for learning" courses should be exactly that -- "no philosophy wanted". A few (4) mentioned that they would like classroom practice with feedback built into the course. Only three (3) said it was important to understand what you are doing.	33	46%	
B. "Quality control" of instructors, equitable course requirements, and availability of collegial discussion Teachers were concerned that their university instructors be good teachers and be familiar with the real world of the classroom. They wanted clear objectives publicized, less wasted time on tangents, and opportunity for small group work and sharing of ideas.	30	42%	
C. More available courses in teaching of specific subject areas and grade levels Teachers said they wanted more methods courses in kindergarten and primary teaching, in computers, science, art, and music. They did not think courses from other fields were necessary for elementary teaching, particularly not senior level undergraduate English courses.	9	13%	

*Results for respondents who had completed pre-service training. Some mentioned more than one suggestion.

Table 10

Questionnaire Results,* Part II (Question 5)

Please list some questions about any aspect of your teaching that you think coursework could help you address: (classroom management; maturation; organizing social studies units; teaching writing; grading and record keeping; providing for individuals' differing abilities, etc.)

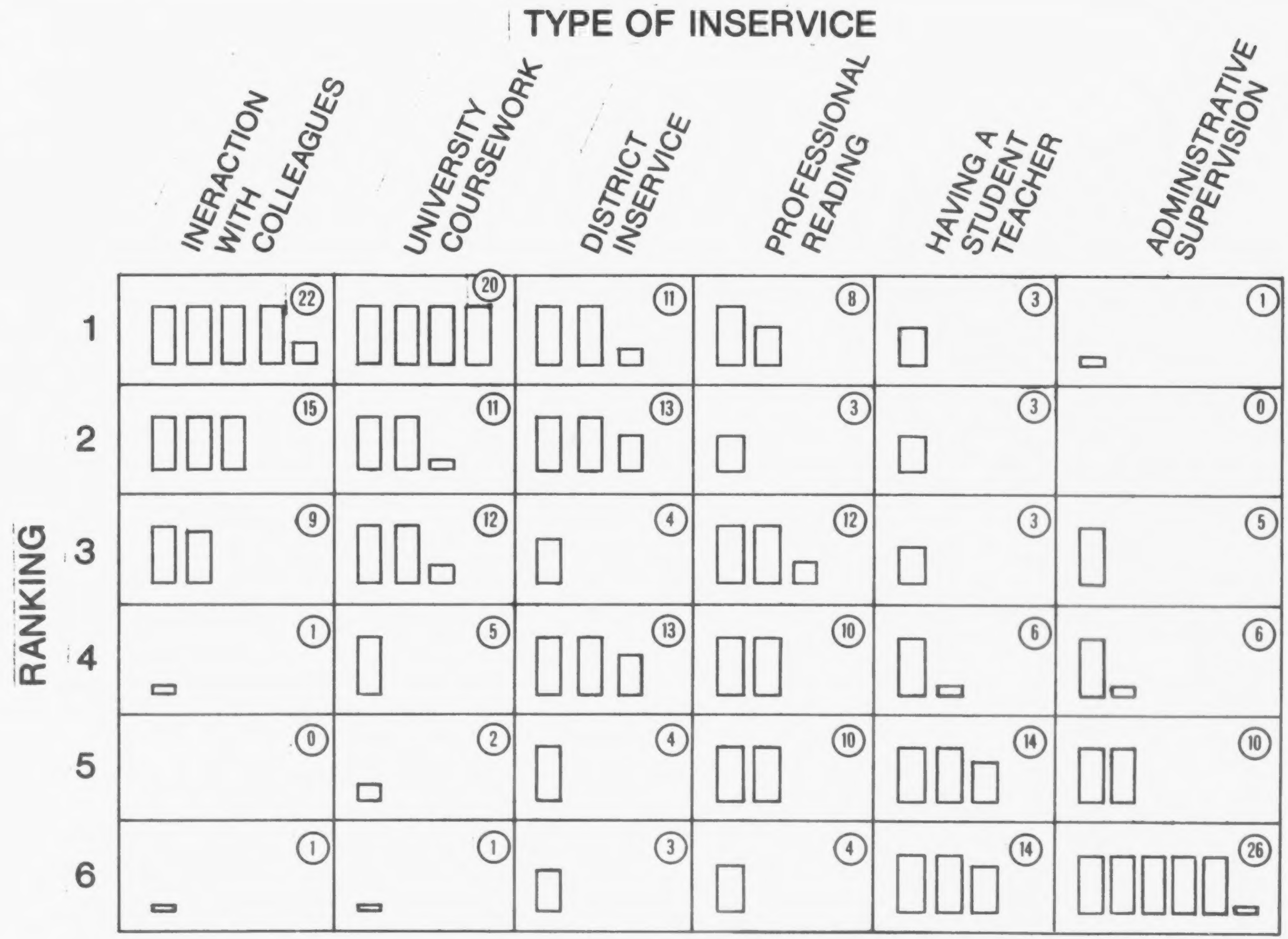
Interpretive Comment: Practising teachers did not list as many questions in this section as did pre-service teachers, i.e. possibly because they are less insecure about their teaching skills than are preservice teachers. It also seems likely from the results that the teachers who responded to this question were influenced by the examples we suggested in the question. That does not mean that the teachers who mentioned "classroom management" are not interested in coursework on that subject; but it is possible that fewer would have mentioned that topic if it had not been listed among the examples in the question.

	Answers	Number	Percent	(N=21)
A.	Specific subject areas or skills Teachers wanted help teaching such subjects as science and social studies and such skills as writing.	8	38%	
B.	Classroom management and providing for individuals Teachers wanted suggestions for dealing with behavior problems and for providing for various types of individuals within the classroom context.	7	33%	
C.	Evaluation, grading, and record-keeping Teachers wanted to find out different ways of evaluating, particularly with discovery methods and group and individualized learning.	4	19%	
D.	Other One teacher wanted to know more about self-evaluation; another wrote "accountability of principal."	2	1%	

*Results for respondents who had completed preservice training.

The responses to questions 1-5 of Part II of the questionnaire reinforce the common assumption that teachers say they want specific skills and techniques for the classroom when they come to university for coursework. However, a look at the differences between the responses of the same teachers to questions 1 and 2 shows that they appear to find understanding and knowledge more important after they have taken courses than before. This shift in attitude corresponds with the remarks of some of the teachers in the research project who recognized that they needed to understand what they were doing before they could fully integrate a new technique into their classroom practice.

Question 6 on the questionnaire asked the teachers to rank the value of six types of in-service education. It included a blank space for "other," but no one added anything. The graph (see Figure 1) shows how all the questionnaire respondents ranked the types of in-service education. The fact that "interaction with colleagues" was ranked first by the largest number of respondents may partially result from the teachers' being in their last week of classes and particularly conscious of the fact that they would soon be without the weekly university classroom informal discussions. The teachers ranked university coursework as a close second in value. We suggest that this ranking may also be related to the context of the questionnaire. When we gave the same ranking question to 23 secondary English teachers at a district in-service workshop, they ranked "district in-service" at the top. Earlier studies (Wideen & Hopkins, 1984) have suggested that one of the most important in-service influences on practising teachers is having a student teacher, but this experience did not appear to be significant for the teachers who responded to this questionnaire.



RANKING	INERACTION WITH COLLEAGUES	UNIVERSITY COURSEWORK	DISTRICT INSERVICE	PROFESSIONAL READING	HAVING A STUDENT TEACHER	ADMINISTRATIVE SUPERVISION
1	22	20	11	8	3	1
2	15	11	13	3	3	0
3	9	12	4	12	3	5
4	1	5	13	10	6	6
5	0	2	4	10	14	10
6	1	1	3	4	14	26

Teachers' ranking of the value of inservice education opportunities.

KEY: ▯=5 RESPONSES

Conclusion

The answers to the first question in Part II of the questionnaire indicate that teachers are primarily interested in practical ideas for the classroom. At first glance this result may seem contradictory to the results of interviews with teachers in Education 406, who commented on the importance of understanding what they were doing. However, this apparent contradiction may indicate instead different positions on a range of reactions to in-service education. One possible hypothesis is that teachers begin in-service courses with the hope that they can learn some new methods which they can use directly in their teaching. As they learn about the new methods and reflect on their own practice, they recognize that the implication of the methods are not simple and that the new methods are not necessarily right for all teachers and all classes. They begin to understand the importance of the fit between any method and their philosophies of education.

DISCUSSION

The first objective of the study conducted by the authors of this report was to examine the impact of a particular type of coursework on teachers' instructional activity. Secondly, an attempt was made to identify those factors accounting for the differences in the impact of the coursework model among the teachers, assuming that differences were in evidence. Because of the specificity of our model and also because of our general interest in university coursework the study was extended to gather information about the perceptions held by teachers toward coursework. In this section, we discuss our findings in regard to these three questions.

Before turning to this discussion, some caveats are in order. First, our primary source of data was limited initially to nine teachers and in the final analysis to seven who completed the study. It can hardly be claimed that the results from a sample of this size are generalizable to a larger population of teachers. It should also be noted that the model examined in this study was very specific and carried out within the context of the program at Simon Fraser.

Second, despite our best attempts to use triangulation to confirm our results, it must be recognized that our views of teaching and our belief that teachers are the center of any real reform in education undoubtedly influenced the conclusions we drew and perhaps the areas in which we drew those conclusions. Our views of how reform occurs in education are much closer to those who argue for teacher autonomy than to those who espouse externally initiated approaches to educational reform.

Further, we recognize that this study has a limitation that is imposed on all social science research: time. Despite having spent 10 or more periods in the classrooms of these teachers we regret not having the resources to spend more time there. Also, as we begin to analyse and reflect upon the mountain of data collected, we again wanted more time to sift, ponder and reflect. But at some stage one has to draw a halt to that process. In so doing we see this final report not as a point of closure but as a temporary pause where we draw together what we have learned, identify new questions to pursue, and perhaps form different perspectives on the questions that motivated this study.

Given these caveats, we suggest that the results be treated as hypotheses for further thought and examination, both through research and reflection by teachers, and by those who take it upon themselves to influence their work.

Did Changes Occur?

In response to this first question which asked if changes occurred that could be attributed to the model, our answer, as shown in the previous section, was obviously yes. However, the types of changes that occurred varied among settings and the individuals concerned. Taking these differences into account, this study can be seen as a demonstration that a particular model of university coursework can lead to observable changes in classroom practice.

From a perusal of the results presented in the previous section two points become obvious and deserving of comment. First, as we pointed out in our summary of the changes that were shown in Table 3, a definite pattern emerged as to the nature of those changes. As we observed in discussing the changes, "All teachers moved toward relinquishing some degree of control or authority in order to stimulate student involvement in the learning." This consistency does raise the question as to where these patterns came from. They did not come from the problem-focused course because that was not taught with any type of orthodoxy. Students were only asked to focus on some type of problem in their teaching. Some did take courses in the previous semester which focused upon an inquiry in science which obviously encouraged student involvement in learning, but not all of them pursued that course or ones similar to it. We think that this particular finding does raise the question as to why teachers pursue the particular innovations they do.

The second area of interest related to the impact of university coursework arose from the results of the questionnaire. When teachers were asked to indicate what they expected to gain from university coursework, the largest group of comments, 44%, identified skills and techniques. This result was confirmed repeatedly during our interviews. In the literature this tendency among teachers has been described by Doyle and Ponder (1977-78) as the "practicality ethic". When the same teachers were asked to indicate what they received from the university, only 29% of the comments, the smallest of three categories, indicated receiving skills and techniques. The remainder said they had received understanding and knowledge and personal rewards. We consider this shift to be a significant one.

Obviously, teachers expect one thing from coursework, but many find that they gain something else. This shift can be interpreted in terms of the university coursework changing the perspectives of teachers about what they think they need. Since it is hard to argue anything other than knowledge and understanding being a good thing, this shift might well be seen as a positive one. We have no data about what this particular group of teachers did with such knowledge and understanding. However, we did see much evidence in our sample of seven teachers that there is a long distance from language to practice. Thus, we caution people from taking too much consolation from this result if they are concerned with what teachers do in classrooms.

It is here where the problem-focused course as we have described and examined it offers a significant step forward. It appeared to provide a bridge between what universities normally offer and the implementation and application of such knowledge in the classroom. Universities will have to pay much more attention to the understandings that teachers have about their own work if they are to assist them in using coursework as a means to improve teaching.

Much of university coursework is primarily concerned with such knowledge and understanding and how that might be taught. Frequently, however, such coursework is far removed from the practical realities of classrooms and fails to pay much attention to the epistemological views of teachers. In such cases it is doubtful that university coursework will have much effect on classroom practise.

We found a great deal of variation in the changes that teachers made in their respective classrooms. In some of the classrooms, we saw little evidence of any change; in others, a great deal. This variability provided us with an opportunity to attempt to identify those influences which accounted for the differences we observed.

Influences Accounting for Differences

When we examined these changes and considered what we had learned about the teachers and each setting through observation and interview, several influences appeared to explain the changes that occurred. Some accounted for differences among the individual teachers while others were characteristic of all teachers. We think that these influences have much importance for those involved in planning university coursework and in-service programs for teachers where the aim is to improve instructional activity.

We discuss these influences under the following headings: 1) conceptual structures, 2) motives, 3) support structures, 4) the process of change, and 5) reflection.

Conceptual structures. One important influence on the teachers at all stages of the coursework and the implementation of action plans became apparent as they talked about the subject[6] matter they taught and how children learned it. All teachers in our sample were able to discuss their subject matter and how they think students learn it; however, the actions of some of the teachers we studied seemed to be informed by a more coherent view of that subject matter and its teaching than others. They were able to see the relationships among the different elements of what they taught. They appeared to grasp what Bruner (1958) referred to a number of years ago as "the structure of the discipline." For them, an interconnectedness existed not only among the elements of the subject taught, but also among the subject, how it was being taught, and how children learned it. Such interconnections could be said to constitute a coherent view. In a number of ways, these teachers typified Schon's reflective practitioner (1983). For others their view appeared to exist in a so much less coherent way that they had little basis for reflection.

Having a coherent view of the subject being taught appeared essential for teachers to deal with what Schon calls "situations of uncertainty, instability, uniqueness, and value conflict" (p. 50). As we have pointed out before, not only did it appear that the relationship among the different subject components be understood in some way, but some view of how children should learn the subject and how it should be taught also appeared necessary.

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[6] By subject we refer not only to the traditional subject areas taught but also to more generic areas such as thinking skills.

As indicated earlier, we found considerable differences among the teachers in our sample with regard to how well they had constructed a view of the subject they were teaching. For some, the view of the subject and of how it should be taught were unconnected to practice. In addition, the different elements of the material being taught were poorly related. In a subject such as science, for example, the subject would be seen as a set of unrelated facts, procedures, and techniques. For others, these elements were related in some coherent way not necessarily resembling the discipline but nevertheless coherent. Those in the latter category were much more able to manage the changes in their classrooms because changes could be related to some definite structure.

If university coursework and in-service education are to make a difference in what teachers do in the classroom, then the implications of the notion we have just discussed are clear. Efforts are required to make teachers aware of their own understanding of the content they teach and to build on their conceptual understandings regardless of how complex or simple those understandings are.

Such a focus would be in sharp contrast to what is presently being done in much university coursework. Typically, the emphasis is on the presentation of improved practices or on the various theoretical aspects of teaching. Little effort is made to link such material to the personal knowledge possessed by teachers. Yet without such links, we think coursework will continue to have little effect upon the work of teachers.

Other types of professional growth experiences such as in-service efforts are similarly inadequate in terms of assisting teachers to develop coherent views of what they teach. Teachers are usually presented with a cafeteria of offerings during professional days, with little time or opportunity provided to relate these to their own understanding or personal experience.

We saw the problem-focused coursework model providing an important link between the regular coursework and the classroom practice of teachers. However, when the model was developed, we were not aware of the importance of the teachers' conceptual grasp of the subject matter. As a consequence we recommend that steps be taken in the future when this model is to be used to incorporate some means by which teachers can reflect upon their grasp of the subject matter and how it is taught before they attempt to make changes in what they do.

Motives. From our analysis it became evident that the motives behind the pursuit of coursework on the part of the teachers in our sample varied greatly. For all the teachers in our sample, successful completion of the coursework we examined was a step closer to the completion of a degree. This obviously represented one level of motivation. For some the motives for taking the class and for being involved in the coursework model, at least at the early stages, did not go beyond that. For others, each university course was seen as an opportunity to improve their classroom teaching in some way. Education 406 and the research project, because of their stated objectives, were thus seen as an ideal vehicle to them. As one might expect, more change was evident in those cases where the motivation was to improve classroom practice. For others, the university coursework appeared to have little effect, perhaps because the teachers saw virtually no link between it and their classroom practice.

What appeared to be necessary was the need for the recognition of a discrepancy between what they were doing in their classroom and what might exist if some alternative model of teaching were implemented instead.

However, to result in a desire for change such discrepancies required more than the recognition of a deficiency. The discrepancies in practice had to be understood within some type of conceptual view of the subject of meaning system or need state which each teacher brought to the situation or which was presented. In most cases we found such meaning systems embedded within a view of the subject matter that we discussed in the earlier section.

The role of university coursework, particularly in content areas, appeared to be that of creating an awareness of discrepancies and a need for change. However, it was evident that traditional coursework in and of itself did little to cause most teachers to act upon those discrepancies despite the fact that the coursework did create a general motivation for change. For change to actually take place, the teachers appeared to need the assistance of some kind of support.

Support structures. We found support structures to be essential for most teachers to accomplish change within their classroom. The type of support that we observed ranged from an outsider confirming the teacher's viewpoint to the more active process of observation and coaching. We found different examples of it, but in no situation did we observe a change where some type of supporting structure was not in evidence. In the coursework model which was the subject of our study, a mentor, called the faculty associate, provided ongoing support to the teachers. Every teacher in our sample made reference to this person when asked about those things which were most helpful in guiding them through the change. However, it was also evident that other mechanisms were also used for support. In one case the principal of the school provided an important role in assisting the teacher to work through a change. He had recruited her to the school, had given moral support to make the change, and was observed to visit her class often. For most of the teachers we observed, the principal's role was that of an inactive supporter in which general approval was in evidence, but little active assistance given. Such support did not appear to have any useful impact in terms of helping the teachers make changes.

In another case, a teacher reported that she had actively sought a support group of peers within a school to assist her in accomplishing a change in teaching she wished to make. The principal was not part of this support group. We observed and interviewed teachers in other situations who made use of things such as peer groups, reflective journals, or in one case a well chosen text to provide a support mechanism for them as they introduce change into their classroom practice.

We concluded that if support mechanisms are not available for teachers wishing to improve their classroom practice, then little actual change is likely to occur. The obvious recommendation we make then is that such mechanisms be built into coursework models that are intended to improve the practice of teachers. The particular type of support can vary from one situation to the next. The use of faculty associates, despite some problems, appeared to be particularly effective. As we have shown above, however, using a faculty associate is not the only means of support that can be effective.

Process of change. The elements of the problem-focused coursework model that provided instruction on how to manage the change process in one's classroom are described elsewhere. From our examination of the model it became evident that making teachers aware of the processes that they are likely to go through as they undertake a change in their classroom will greatly enhance the probability of changes occurring. In the words of one teacher, "I will think differently about change from now on."

Our examination of the effects of this model and our experience with its use led us to offer the following cautionary note to that general conclusion. First, because change occurs within a context, one cannot assume "a process of change" but rather processes of change that teachers experience and can benefit from if they are aware of them. Such an understanding of change should be seen as both developmental and individualized and one that comes through experience. Therefore, in this connection, we would recommend that training sessions dealing with change be closely related to actual practices of change that teachers may have experienced. Efforts should be made to draw on what Stake (1985) has termed vicarious experience in this regard.[7]

Second, elaborate implementation plans are unnecessary because as they are produced one then is faced wih the dilemma of having to "implement the implementation plan."[8] The key thing once one has decided to make a change in one's practice is to get started on some beginning steps of an action plan rather than waste all one's time and energy in planning.

This caution should not lessen the importance of teachers' being made aware of the strategies of implementation and change that have been found to work for others and the factors that often stand in the way of introducing improvements into one's teaching. Changing the regularities that we live with on a daily basis is difficult; the literature on change and implementation can assist teachers in this regard; however, that literature must be seen and taught as a process, not as an end in itself.

[7] Stake describes vicarious experience as that which is a well-placed substitute for those not able to have the experience themselves. In the case of the training model under discussion, one might draw on the experience of teachers who have experienced a change in their classroom to describe that experience and to then make it available to others.

[8] Michael Fullan (1982) was the first person to use this term. In doing so he cautions us against the difficulty of creating a technology which itself stands in the way of doing what we originally set out to do.

Reflection. At all stages in the process of introducing changes into their classroom practice, those teachers who reflected realistically upon their teaching and learned from that reflection appeared to have a great advantage.

Some of those in our sample seemed able to apply knowledge to their practice much more readily than others. Partly, this was a function of their having a view of the subject as we pointed out earlier, but it also appeared to be a function of their ability to learn from their own actions, trials and errors and to have a realistic view of their teaching. New practices became a means of extending what they saw as good teaching where those practices fit into a view of what good teaching was in their view. The most satisfactory description of this that we found in the literature was the notion of reflection in action by Schon (1984). Others (Oberg, 1985) have experimented with techniques and offered insights into how teachers can be made to be more reflective about their work.

Commentary

We recommend that any type of coursework or in-service that is aimed at improving the work of teachers incorporate some means to assist teachers to reflect upon their practice. Since all but one of the seven teachers on whom we did case studies attended the problem-focused seminars, we had no group from which to gather comparable data. However, all indications were that the seminars were essential to assisting the teachers to make changes in their classroom instruction. Based on our analysis of the data we make several recommendations with regard to the seminar component to make it a more effective component for helping teachers to improve their practise.

Summary.

In our introduction we identified the dissemination function as an important one for universities. Coursework offered through faculties is one way of discharging this function. In this study we saw evidence that traditional university coursework does little to improve classroom practice partly because much of it is foreign to practice and partly because few attempts have been made to assist teachers in implementing the ideas that are presented. The problem-focused course that we examined in this study provides a model for bridging this gap.

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EDUCATION 361-3

Contemporary Issues and New Developments in Teaching
(Problems in Implementation)

SPRING, 1985 INSTRUCTOR: Marvin F. Wideen

Wednesday, 4:30 - 7:30 p.m. LOCATION: MPX 8620

This course provides the student with an opportunity to examine problems and issues related to the implementation of new ideas in schools, a topic of concern to educators for many years. This examination will be carried out through selected reading, seminar activity and topical presentation. Those in the course, who are working in schools or some other type of institution, will be encouraged to examine their workplace to find successful and unsuccessful examples of implementation and to relate them to the topics being examined in the course.

An important component of this course occupying four to six sessions will be specific training in implementation and action research designed to provide the teacher with competence to identify problems in her/his teaching and to take steps to solve them. Part of this training involves the use of theory, demonstration, practice and feedback related to particular problems.

It is expected that many who enrol in the course will also be taking Educ. 406-5, Professional In-Service Practicum, to which many of the topics will be related.

Evaluation:

Evaluation in the course will take the form of an exit interview to examine the readings and seminar activity, and a final paper which may include some attempt made to improve practice or to implement some innovation into the classroom.

Required Text:

Hopkins and Wideen. New Perspectives in School Improvement.

APPENDIX B

SFU
SIMON FRASER UNIVERSITY, BURNABY, B.C. CANADA V5A 1S6
FACULTY OF EDUCATION: 291-3395

November 22, 1984

To: Practicing Teachers
Enrolled in Education Courses in 84-3

From: M. Wideen
Faculty of Education

Subject: A Research Project of Interest to Your Teaching

The paper that is attached describes a research project that will be conducted next semester (85-1) at Simon Fraser University. Please complete the following tear-off sheet and return it to me if you are interested in participating in the project.

- -

Return to Dr. M. Wideen, Faculty of Education

	YES	NO
I will be enrolling in EDUC. 406 in 85-1	☐	☐
I will be enrolling in EDUC. 361 in 85-1	☐	☐
I will be enrolling in both EDUC. 361 and 406 in 85-1	☐	☐

I'm interested in someone from your research team contacting me regarding my possible ionvolvement in the research project.

My name is ____

My telephone number is ____________________________

I'm currently (84-3) enrolled in the following Education courses:

____

____

A RESEARCH PROJECT OF INTEREST TO YOUR TEACHING

As we introduce the new coursework (EDUC 361 and 406), it is important to obtain some indication of its success. Fortunately, the university has provided us with funding to conduct a follow-up study of ten teachers. The purpose of this memorandum is to briefly outline what is to be involved in that research and what the benefits will be to the teachers involved and to the university.

The purpose of the follow-up study is to first find out how the ten teachers go about their job of teaching. In doing this we have no prior perceptions about how teachers should be teaching. We only want to know how the ten people go about their task. Because this is intended to serve as baseline data, we hope to collect it as soon as possible, preferably before Christmas but if not, certainly early in January. To do this we would simply place an observer in the classroom of each teacher(5 visits) to observe, as unobtrusively as we can.

Each of the teachers will then be involved in one or other of the two courses, or both. Near the end of the year, April and May, we intend to conduct a second intensive perion of observation.

What these observations will tell us is first, how the ten teachers teach and second, how that teaching changes over the period of six months as a result of the involvment in problem-focused cousework. In short, what we intend to do is to examine the effects of the coursework model.

What do we need from the ten teachers involved? First, we need your O.K. to become a standard piece of furniture in your classroom, so standard that we will not even be noticed. The university has standard permission forms for you and your principal to sign. But first we need your O.K.

Second, we need to spend some time talking to you. For example, as we gather our picture of how you teach, we want to compare our perception with yours.

Third, as soon as we have ten participating teachers, we would like to pay a substitute teacher to take your class for a couple of afternoons so that we can explain the project to you in detail and discuss the results.Your principal is welcome to join you.

What is in it for the people involved? First, there is the value of seeing your teaching through the eyes of others. We will watch and describe to each of the teachers their teaching patterns. Surely this is a plus. Second,we think the whole project at Simon Fraser is a breakthrough. You will be one of the ten pilot teachers involved.

One last item. Your teaching profile will remain completely confidential. Only the general results will become public.

PRELIMINARY INTERVIEW/SCREENING

Information to be obtained:

Principal's attitude

Is the principal supportive of the idea. -- we need to talk.

Response to observation

How do you feel about being observed while you are teaching? What were your feelings today? Did you notice differences in your students' behaviour? What would you suggest doing to help maintain as normal or typical environment as possible? Or perhaps that is not important, because you may notice differences in performance that could be attributed to the changed atmosphere as well as to the coursework?

Informing students about project

I would like to explain the research project to the students, or at least to explain my presence in the classroom. Perhaps we could plan together what to tell them about what we are doing and why.

Ideas and attitudes about research

Are you familiar with any research projects, or have you been involved in any before? What are your opinions about research that you've heard about? Could you describe your attitudes toward research and theory about teaching.

Value of participation in project

What would you expect being involved in this project to do for you as a teacher? Or, what would you like it to do? Do you think it, as well as the coursework, might affect your teaching? If so, how and why?

Teacher's method of handling teaching problems in past

This project is about the effects of the Problem-focused coursework at SFU. In that course, you would be working on a teaching problem that you have identified. What have you done before about teaching problems? How do you go about finding alternative ways to deal with something? Who gives you support, or ideas, and how do you evaluate the success? Could you please give me an example of your making a change and tell about it. Was there some way you had of determining that it was a change for the better? Did the method you used to make that change work for other problems? If so, what are they?

Time consideration

Do you have any questions about the time or the timing of this research project?

Peer support and interest

Are there other teachers here who share some of your concerns about their teaching? What are some problems you think you have in common? While you're doing your coursework and being in the project, would you feel comfortable in turning to these teachers for their comments and help? In what ways have they been helpful to you in the past?

Administrative, district & community support

Are there others in the school, district, or community, who are support people for you in your job? What kinds of roles do they play? How do you encourage teachers? Are there people around who are discouraging -- like nervous parents, perhaps?

OBSERVATION SCHEDULE #1

NAME OF TEACHER: ______________________ SCHOOL: ______________________

DATE: ______________________ DURATION: ______________________

CLUSTERS

1. Role of the Teacher
   - self-perception
   - philosophy determining action
   - flexibility
   - responsibility
   - leadership
   - role in classroom
   - role in school

2. Nature of the Class
   - teacher perceptions
   - student perceptions
   - observer perceptions
   - action zone

3. Planning
   - rationale for lesson
   - selection of concepts or objectives
   - selection of materials
   - selection of methods

4. Role of the Student
   - self-perception
   - attitudes toward teacher/subject
   - activity/passivity
   - control of learning
   - time on task
   - learning outcomes
   - responsibility
   - academic learning time

5. Interactions
   - individualizations
   - feedback
   - reinforcement
   - classroom management
   - instruction

6. Evaluation
   - frequency
   - type
   - level

OBSERVATION SCHEDULE #2

NAME OF TEACHER: ____________________ SCHOOL: ____________________

DATE: ____________________ DURATION: ____________________

7. Organization of the Lesson	How and When Information Collected
introduction of the lesson	pre-observation discussion with teachers
administration of activities	observation of lesson
timing and pacing	observation of student response
review/transition to other lessons	
follow-up	
conclusion of the lesson	
routines	

* * * * * * * * * * * * * * * * *

How did the lesson begin? Was the objective of the lesson clear to the students? Were instructions clear? Were activities and instructions paced appropriately? Was there any connection to other lessons? How were activities organized? Were there particular routines in place? What part did students play in the organization of the lesson? How did the lesson conclude?

APPENDIX E

CONTACT SUMMARY SHEET

Visit ____ Phone ____

Site ________

Date of Visit ________

Today ________

Observer ________

Code

People Involved:

Questions Addressed

1. Eff ________
2. Fac ________
3. Con ________
4. Area ________
5. Val ________

1. What were the main themes or theses that struck you in this contact?
   Code:initial - in. Follow up = fol Reflective - Ref.

2. Summarize the information you obtained (or failed to obtain) relative to the target questions you had for this contact.

Question	Information

3. Any new hypotheses, guesses? What about next visit?

APPENDIX F

EDUCATION 406
FACULTY OF EDUCATION
SIMON FRASER UNIVERSITY

PROGRAM EVALUATION

The content and dynamics of Education 406 are largely determined through the development and implementation of individual, classroom-based projects. In order to evaluate and improve the Educ 406 program, we need your feedback. This questionnaire addresses the components of Educ 406 and your thoughts on the overall impact of the program. Your responses are for the purpose of program improvement and will not be used for instructor evaluation.

Thanks for your cooperation.

Education 406 Section:
406 #2 (Olliver) ☐
406 #3 (Hearn) ☐
406 #4 (Zola) ☐
406 #5 (Wassermann/Buchan) ☐

Name: ______________________________ Telephone: ______________

Address: ____

____

______________________________ Postal Code: ______________

Current Teaching Assignment/Grade Level: ______________________

Number of Years Teaching Experience: ______________________

Teacher Training Institution(s): ______________________

Post-Secondary Educational Background Years: _____ Degree(s): ______________

When did you last register in a credit course? ______________________

SPRING 1985

INDIVIDUAL PROJECT (Project Component):

Q1 Did your project mainly involve:
an instructional focus ☐ a curriculum focus ☐ both ☐ neither ☐

Q2 Would you have carried out this project if you had not registered in Educ 406? Yes ☐ No ☐ Not Sure ☐
If 'yes', did Educ 406 make a difference to the way you implemented the project? Yes ☐ No ☐ Not Sure ☐
Comment:

Q3 Please indicate your level of agreement with the following statements.
5=STRONGLY AGREE 4=AGREE 3=NEUTRAL 2=DISAGREE 1=STRONGLY DISAGREE

Your Educ 406 project had a significant impact on:

a) your classroom teaching	5	4	3	2	1
b) your school	5	4	3	2	1

Comment:

Q4 Please comment further on the project component of Educ 406 (e.g., how might the project component of Educ 406 be improved?):

GROUP SESSIONS (Instruction and Seminar Component):

Q5 How many group sessions did you attend?

Q6 Did the group sessions mainly focus on: discussion and problem-solving ☐
theory and practice of implementation ☐ both ☐ neither ☐
Comment:

Q7 Please indicate your level of agreement with the following statements.
5=STRONGLY AGREE 4=AGREE 3=NEUTRAL 2=DISAGREE 1=STRONGLY DISAGREE

The group sessions were effective in helping you:

a) identify and define your project proposal	5	4	3	2	1
b) implement your project and solve problems	5	4	3	2	1
c) monitor and evaluate your progress	5	4	3	2	1

Comment:

Q8 Please comment further on the instruction/seminar component of Educ 406 (e.g., how might this component of Educ 406 be improved?):

IN-SERVICE ASSOCIATE (Classroom Support Component):

Q9 How many times did your In-Service Associate visit your classroom?_____

Q10 How many hours did the In-Service spend in your classroom?_____

Q11 Was the number of visits and amount of time spent adequate given your specific project? Yes [] No []
Comment:_____

Q12 Please indicate your level of agreement with the following statements.
5=STRONGLY AGREE 4=AGREE 3=NEUTRAL 2=DISAGREE 1=STRONGLY DISAGREE

Your In-Service Associate was effective in helping you to:

a) identify and define your project 5 4 3 2 1
b) establish a baseline 5 4 3 2 1
c) implement your project 5 4 3 2 1

Comment:_____

Q13 Your In-Service Associate provided you with valuable feedback and helped you to monitor your progress.
5 4 3 2 1
Comment:_____

Q14 The role of In-Service Associate is necessary to the success of Educ 406.
5 4 3 2 1
Comment:_____

Q15 Please comment further on the classroom support component of Educ 406 (e.g., how might this component of Educ 406 be improved?):

EDUCATION 406

We are interested in your feelings about the quality of Education 406; please comment on the following aspects of your experience. If additional space is required, use the reverse side of this page.

Q16 What do you expect university coursework to do for you?

Q17 How would you compare the classroom-based emphasis of Educ 406 to other university credit courses you have taken?

Q18 What, for you, was the most valuable aspect of Educ 406?

Q19 What, for you, was the least valuable aspect of Educ 406?

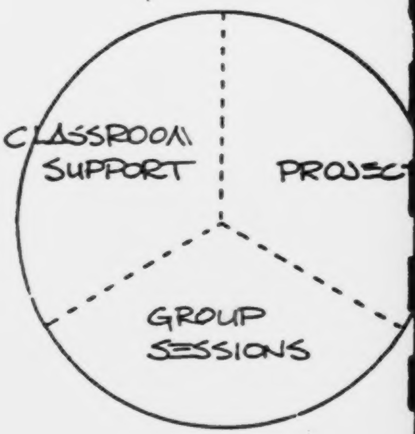
Q20 Would you recommend Educ 406 to your colleagues? Yes [] No []
How would you describe Educ 406 to a colleague interested in taking it?

Q21 Is 5 credits appropriate for Educ 406? Yes [] No [] Not sure []

Q22 Has Educ 406 prompted any changes for you which you feel will continue in the future? Yes [] No [] Not sure [] Please explain.

EDUCATION 406

Educ 406



Q23 Please re-draw the sections of the circle to indicate your view of the relative significance of the components of Educ 406.

Comment:

Q24 Please rate Educ 406 as an overall professional development experience.

Excellent	Good	Average	Fair	Poor
5	4	3	2	1

Q25 Please comment further on any aspect of Education 406 which you consider important.

F1 What form(s) of follow-up to Educ 406 would be valuable to you?

F2 Would you be interested in participating in a classroom-based action and research network in association with SFU? Yes [] No [] Not sure []

THANKYOU

EDUCATION 406 - GROUP 2 **INSTRUCTOR: Steve Olliver**

This section applies only to Group 2 of Education 406. As with the previous questions, responses are solely for the purpose of program improvement.

201 How valuable were the five Educ 361 sessions in helping you formulate and implement your project?

202 How appropriate were the timing and sequencing of the topics in the Educ 361 sessions?

203 How valuable were the Educ 406 seminar sessions in helping you implement your project?

204 In your opinion, should there have been more or fewer of these seminar sessions? More ☐ Fewer ☐ Same ☐

205 Do you think that Educ 361 should be a:
- a) a prerequisite for Educ 406? ☐
- b) a required concurrent course for Educ 406? ☐
- c) neither ☐

206 Please comment on the effectiveness of the Educ 361/406 teaching team.

EDUCATION 406 - GROUP 4 (SURREY) INSTRUCTOR: Mequido Zola

This section applies to Group 4 of Educ 406 (Surrey). As with the previous questions, responses are solely for the purpose of program improvement.

401 How did you first hear about the Surrey section of Educ 406?

402 Did you attend the information meeting? Yes ☐ No ☐
If "yes", was it useful to you?

403 Was locating the group meetings in the school district, rather than on the SFU campus, important to you ? Yes ☐ No ☐ Please explain.

404 How many sessions of Educ 472 did you attend?______________________________

405 Please comment on the process used to "match up" Educ 406 participants and In-Service Associates, and the final results.

406 As you know, Educ 406 is a collaborative project between SFU and Surrey School District. Is the School District involvement significant to you in any way? Yes ☐ No ☐ Not sure ☐ Please explain.

407 In what ways could the School District further support teachers engaged in Educ 406 or similar coursework?

408 Further comments and suggestions.

EDUCATION 406 - PROJECT REPORT

FACULTY OF EDUCATION
SPRING 1985

NAME: ______________________ STUDENT NUMBER: ____________

INSTRUCTOR: ______________________ SEMESTER: ____________

PROJECT SUMMARY

[include rationale, description and outcomes]

UDENT SIGN URE: ______________ INSTRUCTOR SIGNATURE: ______________

APPENDIX G

INTERVIEW QUESTIONS - EDUCATION 406 SPRING 1985

(1) Briefly describe your project.

(2) Did you make any changes in your classroom or teaching as a result of Educ. 406.

(3) If so, would you describe these changes?

(4) Why did these changes seem to be desirable?

(5) What impact did these changes have on your pupils?
How did they respond?

(6) Which aspects of these changes do you feel are worthwhile maintaining?
Why?

(7) What support would you need to maintain the changes you have made?

(8) Would you have implemented this project if you had not been enrolled in Educ. 406?

(9) If so, did Educ. 406 make any difference to the way you went about the project?

(10) Has Educ. 406 affected your attitudes about professional development?
If so, explain.

APPENDIX H

INTERVIEW QUESTIONS FOR THE FACULTY ASSOCIATE

1. We'd like details of your visits to the teachers such as how many times you visited each one, for how long, etc.

2. What problems did all the teachers identify?

3. What did you do for each teacher and why?

4. What type of feedback did you give each teacher?

5. What did you think were the strengths and weakness of your position/role?

6. What did you think were the strengths and weakness of ED 406?

7. What have you learned from your experience?

UNDERGRADUATE EDUCATION COURSE INFORMATION QUESTIONNAIRE

This survey is designed for two purposes. First, we want to obtain information about how our coursework at the university can be improved. Second, we are interested in obtaining data relative to certain general questions about why people enrol in coursework.

The information from each questionnaire will be kept strictly confidential. The code on the questionnaire is for purposes of follow-up since this survey is part of a larger research project. The only people to have access to these codes for follow-up will be Nancy Carlman and Wendy Strachan who are research assistants.

We request your cooperation in completing the attached form. If you wish to obtain an executive summary of the results please contact Wendy Strachan at the address given below and one will be mailed to you in January.

Wendy Strachan	Stanley Shapson
Faculty of Education	Associate Professor
	Director of Undergraduate Programs

UNDERGRADUATE EDUCATION COURSE INFORMATION QUESTIONNAIRE: PART I

Education Course #
Please indicate session (RS = 1, SS = 2)

I. WHICH OF THE FOLLOWING DESCRIBES YOUR STATUS AS A STUDENT RIGHT NOW?

Please write the appropriate number in box #5 on the right hand side.

1. Preparing for PDP
2. Currently in PDP (e.g., 404 Semester)
3. Completed PDP, but not currently teaching
4. A practicing teacher who completed PDP (year completed:)*
5. Completed teaching preparation at another institution, but am not currently teaching.
6. A practicing teacher who completed teaching preparation program at an institution other than SFU (year completed:)*
7. From outside the teaching profession (e.g., this course is an elective for me). Please specify your major discipline ____________________.
8. Other: Please specify ____________________________________.

* If you are a practicing teacher, what is your certification category #? (Please write appropriate number in box #6).

II. PLEASE PROVIDE US WITH INFORMATION CONCERNING YOUR PURPOSE FOR TAKING THIS COURSE:

a) As preparation for the completion of an Education MINOR? (if so, please write the appropriate number in box #7).

1. Learning Disabilities
2. Environmental Education
3. General Education Minor
4. Physical Education
5. Early Childhood Education
6. Education Studies (e.g., Non-teaching minor)

b) As part of a B.Ed. program, but not toward a minor? (Please indicate, yes = 1, or no = 2 in box #8).

c) As part of one of the following programs (If so, please write the appropriate number for your program in box #9):

1. B.A. 2. B.Sc. 3. B.G.S. 4. Extended Studies Diploma
5. Other ____________________________(please specify)

d) For general interest? (Please indicate, yes = 1 or no = 2 in box #10)

e) For upgrading and/or change of teaching specialty? (Please indicate, yes = 1 or no = 2 in box #11)

PART II

DIRECTIONS: Part II

Please respond to each of the following questions as fully as you can, including any ideas that occur to you in any order or style.

1. What do you expect university coursework in education to do for you?

2. What do you gain from taking such courses?

3. List the characteristics of the most successful education course that you have ever taken.

4. Do you think coursework in education could be improved? What suggestions do you have for such changes?

5. Please list some questions about any aspect of your teaching that you think coursework could help you address: (classroom management; maturation; organizing social studies units; teaching writing; grading and record keeping; providing for individuals differing abilities, etc.)

4. Of the following, place "1" beside the one which is most influential to your professional development. Place a "6" beside the one least influential to your professional development. Round the others in the same way.

_____ professional reading

_____ district inservice

_____ having a student teacher

_____ administrative supervision (visits from principals, etc.)

_____ university coursework

_____ interaction with colleagues

Please comment on other factors influential to your professional development.